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Document de recherche 2000/129

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2000 Summer Groundfish Survey update for selected Scotia-Fundy groundfish stocks.

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[1] This series documents the scientific basis for the evaluation of fisheries resources in Canada. As such, it addresses the issues of the day in the time frames required and the documents it contains are not intended as definitive statements on the subjects addressed but rather as progress reports on ongoing investigations.

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[1] La présente série documente les bases scientifiques des évaluations des ressources halieutiques du Canada. Elle traite des problèmes courants selon les échéanciers dictés. Les documents qu'elle contient ne doivent pas être considérés comme des énoncés définitifs sur les sujets traités, mais plutôt comme des rapports d'étape sur les études en cours.

Les documents de recherche sont publiés dans la langue officielle utilisée dans le manuscrit envoyé au Secrétariat.

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ISSN 1480-4883
Ottawa, 2000

Canada

Abstract

A synopsis of the results of the 2000 summer bottom trawl survey on the Scotian Shelf and Bay of Fundy is provided. Survey trends for each stock from 1970 to present are shown as a series of histograms and expanding symbol maps. This information is used in assessment meetings as a key source of information on trends for selected groundfish stocks.

Résumé

Un résumé des résultats du relevé au chalut de fond qui a été effectué pendant l'été de 2000 dans les eaux du plateau néo-écossais et de la baie de Fundy est présenté. Les tendances pour chaque stock dans les relevés de 1970 jusqu'à aujourd'hi sont présentées sous forme d'une série d'histogrammes et de cartes de distribution. Ces résultats sont utilisés lors de réunions d'évaluation comme principale source d'information sur les tendances des stocks de poisson de fond sélectionnés.

Introduction

The annual groundfish bottom trawl survey was conducted on the Scotian Shelf and Bay of Fundy as planned from 3 July to 31 July 2000. The results of this survey were compiled for selected stocks to provide clients with a preliminary view of biomass, abundance, resource concentration, area occupied, size composition, and distribution as determined by the survey. The groundfish stocks covered by the report and the lead scientific investigator are listed in Table 1. The distribution of sampling effort compared with the past three years is shown in Figures 1 to 4. Survey trends for each stock from 1970 to present are shown in Figures 5 to 112. Mean weight and number caught per tow and long term frequency distribution histograms are not adjusted for the research vessel and survey gear changes which occurred in 1982-3. Fanning (1985) reported vessel conversion factors from comparative fishing experiments which are large for some species.

Branton and Black (1999) reported similar results for the 1999 survey. In addition, this document also includes the resource concentration and area occupied indicators which measure demersal fish population distribution. The resource concentration is calculated as the proportion of total survey area occupied by the top 75% of the total population (sets grouped in 10 minute squares). The area occupied is the proportion of sets containing the species of interest. This provides an indication of how widely the species is distributed within the survey area without reference to density.

More comprehensive interpretations of stock status are contained in stock assessment documents prepared annually for the stocks described here. Such reports contain information on commercial fishery catch rates and other survey results when available. Therefore, the abundance trends reported here, based on the survey information only, are not directly comparable to those provided in recent assessments.

Survey Description

The 31th annual Scotian Shelf groundfish survey was conducted from the research vessel CSS *Alfred Needler* out of the Bedford Institute of Oceanography, Dartmouth, N.S., on two trips N426 (3-16 July 2000) and N431 (17 July - 31 July 2000). The survey was conducted using the standard protocol (Koeller, 1981). Two hundred and thirteen fishing stations, from the Upper Bay of Fundy to the northern tip of Cape Breton and offshore to the 400 fathom contour, were completed.

Samples were obtained with a Western IIA bottom trawl towed for 30 minutes at a speed of 3.5 knots. The trawl has a 106 foot roller-rigged footrope and 2000 pound Portuguese doors. The codend is lined with 3/4 inch mesh to retain small fish. All finfish caught were sampled for length and weight and some species were sampled additionally for otoliths to determine age, for evidence of sexual maturity and for stomach contents. Vertical profiles of temperature, salinity, nutrients and oxygen were observed at all fishing stations.

References

Branton, R. and J. Black. 1999. 1999 Summer Groundfish Survey update for selected Scotia-Fundy groundfish stocks. CSAS Res Doc. 99/151. 60p

Fanning, L.P. 1985. Intercalibration of research vessel survey results obtained by different vessels. CAFSAC Res. Doc. 85/3: 43p.

Koeller, P. 1981. Manual for groundfish survey personnel - cruise preparation, conduct and standing orders. DFO Marine Fish Division Laboratory Reference No. 81/3.

Table 1. Stock name, figure list, as well as name, telephone number and email address of the lead investigator for groundfish stocks observed on 2000 summer bottom trawl survey.

Stock	Figures	Pages	Investigator	Telephone	E-mail
4Vn Cod	5 - 8	8 - 9	Mohn	(902)426-4592	MohnB@mar.dfo-mpo.gc.ca
4VsW Cod	9 - 12	10 - 11	Fanning	(902)426-3190	FanningP@mar.dfo-mpo.gc.ca
4X Cod	13 - 16	12 - 13	Clark	(506)529-8854	ClarkD@mar.dfo-mpo.gc.ca
4VW Haddock	17 - 20	14 - 15	Frank	(902)426-3498	FrankK@mar.dfo-mpo.gc.ca
4X Haddock	21 - 24	16 - 17	Hurley	(902)426-3520	HurleyP@mar.dfo-mpo.gc.ca
4VWX Pollock	25 - 28	18 - 19	Neilson	(506)529-8854	NeilsonJ@mar.dfo-mpo.gc.ca
Unit 3 Redfish	29 - 32	20 - 21	Branton	(902)426-3537	BrantonB@mar.dfo-mpo.gc.ca
4VW Plaice	33 - 36	22 - 23	Fowler	(902)426-3316	FowlerM@mar.dfo-mpo.gc.ca
4VW Yellowtail	37 - 40	24 - 25	Fowler	(902)426-3316	FowlerM@mar.dfo-mpo.gc.ca
4VW Witch	41 - 44	26 - 27	McRuer	(902)426-3585	McRuer@mar.dfo-mpo.gc.ca
4VW Winter Flounder	45 - 48	28 - 29	Stobo	(902)426-3316	StoboW@mar.dfo-mpo.gc.ca
4X Plaice	49 - 52	30 - 31	Stobo	(902)426-3316	StoboW@mar.dfo-mpo.gc.ca
4X Yellowtail	53 - 58	32 - 33	Stobo	(902)426-3316	StoboW@mar.dfo-mpo.gc.ca
4X Witch	57 - 60	34 - 35	McRuer	(902)426-3585	McruerJ@mar.dfo-mpo.gc.ca
4X Winter Flounder	61 - 64	36 - 37	Fowler	(902)426-3316	FowlerM@mar.dfo-mpo.gc.ca
4VWX Halibut	65 - 68	38 - 39	Zwanenburg	(902)426-3310	ZwanenburgK@mar.dfo-mpo.gc.ca
4VWX Silver Hake	69 - 72	40 - 41	Showell	(902)426-3501	ShowellM@mar.dfo-mpo.gc.ca
4VsW Winter Skate	73 - 76	42 - 43	Simon	(902)426-4136	SimonJ@mar.dfo-mpo.gc.ca
4VWX Monkfish	77 - 80	44 - 45	Beanlands	(902)426-3515	BeanlandsD@mar.dfo-mpo.gc.ca
4VW White Hake	81 - 84	46 - 47	Fowler	(902)426-3529	FowlerM@mar.dfo-mpo.gc.ca
4X White Hake	85 - 88	48 - 49	Fowler	(902)426-3529	FowlerM@mar.dfo-mpo.gc.ca
4VWX Wolffish	89-92	50 - 51	McRuer	(902)426-3310	McruerJ@mar.dfo-mpo.gc.ca
4VWX Cusk	93-96	52 - 53	Comeau	(902)426-4136	ComeauP@mar.dfo-mpo.gc.ca
4VW Lumpfish	97-100	54 - 55	Wilson	(902)426-3318	WilsonS@mar.dfo-mpo.gc.ca
4X Lumpfish	101-104	56 - 57	Wilson	(902)426-3318	WilsonS@mar.dfo-mpo.gc.ca
4VW Turbot	105-108	58 - 59	Frank	(902)426-3498	FrankK@mar.dfo-mpo.gc.ca
4VWX Spiny Dogfish	109-112	60 - 61	Hurlbut	(506)851-6216	HurlbutT@mar.dfo.dfo-mpo.gc.ca

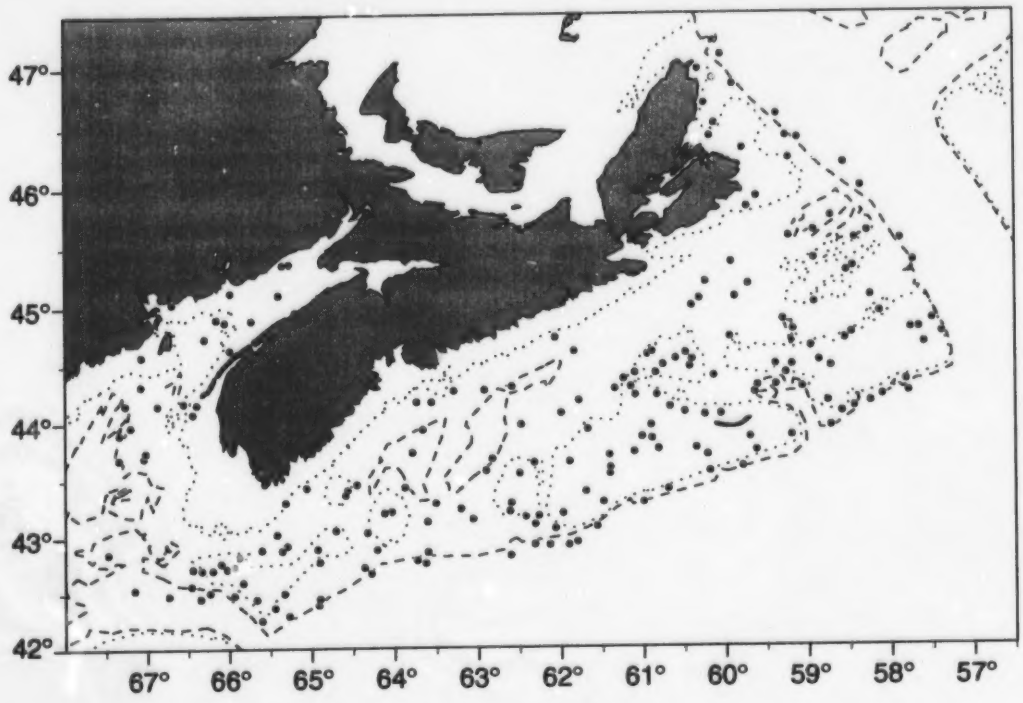
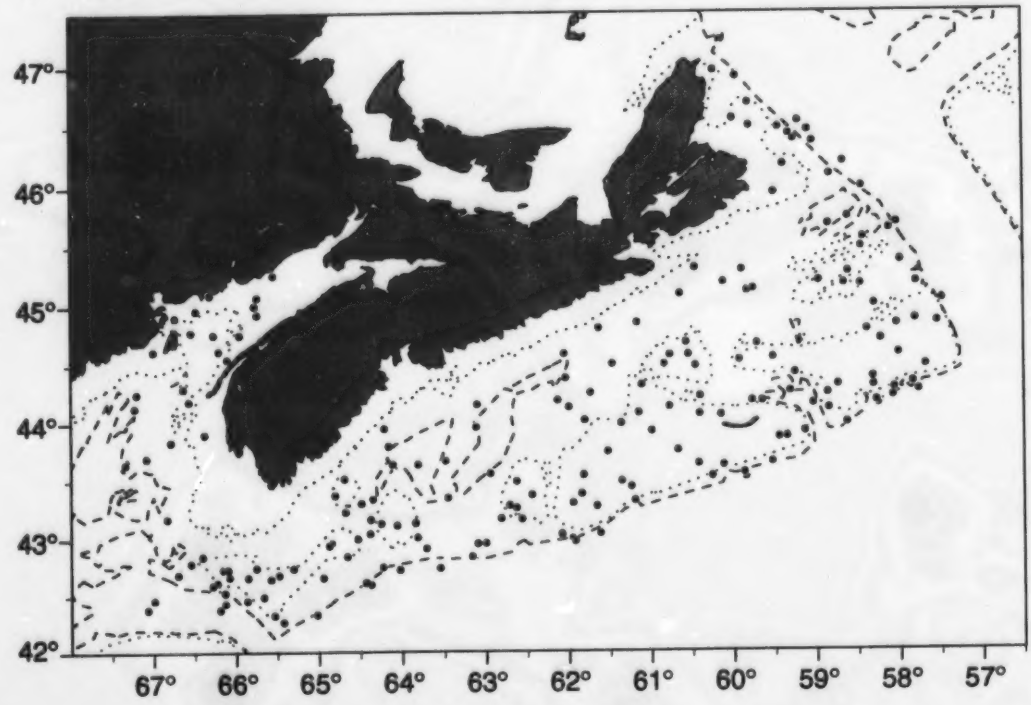


Fig. 1. Summer Groundfish Survey Positions 1997



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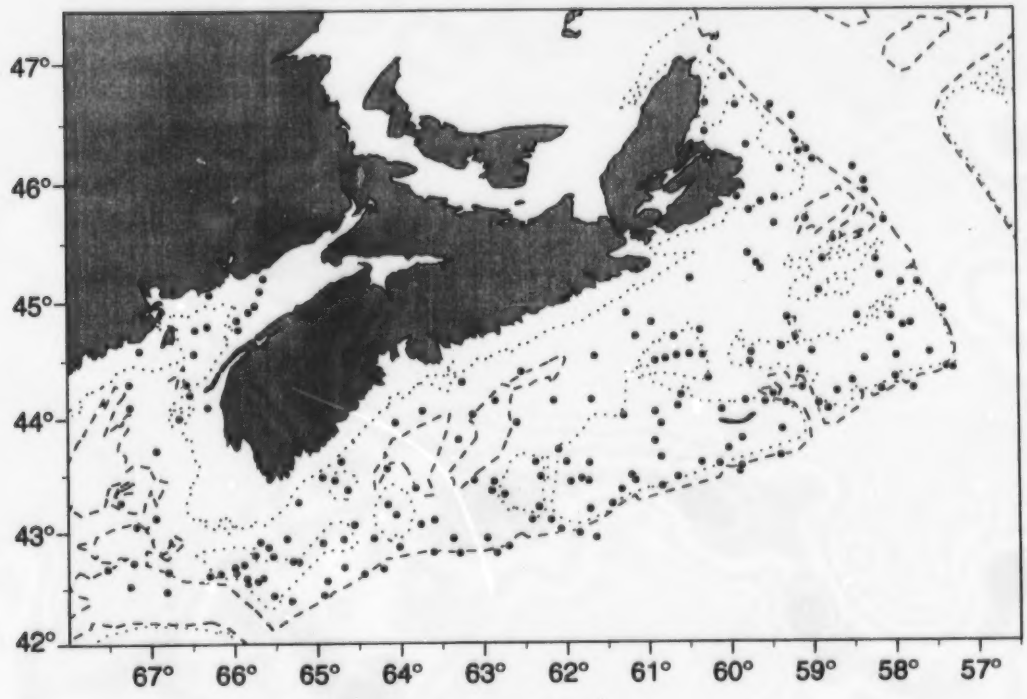

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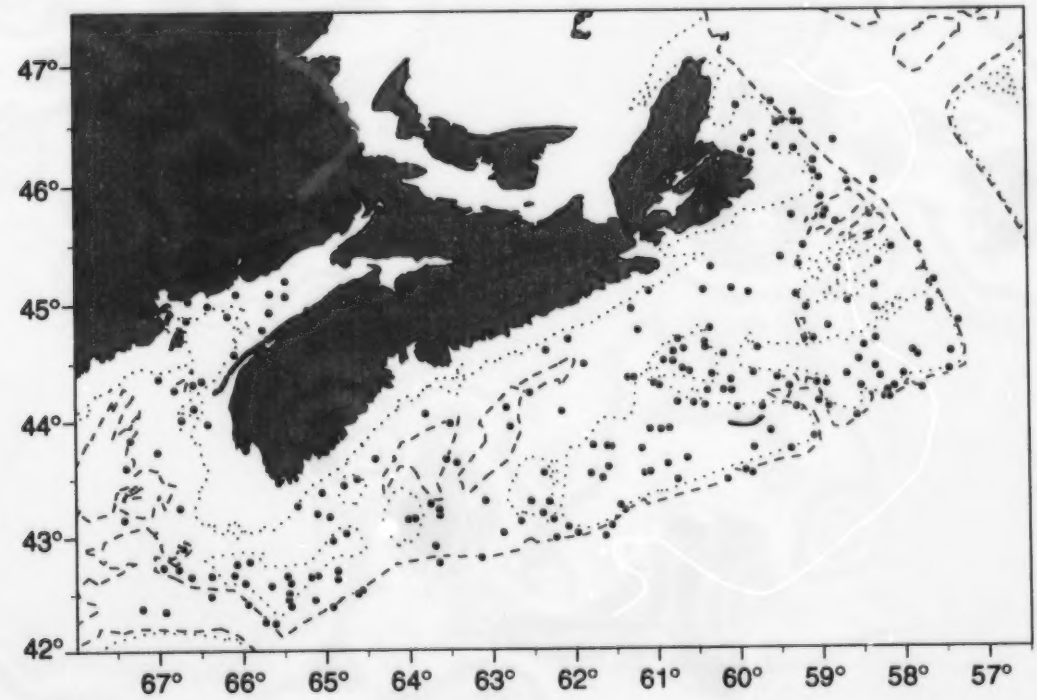

Fig. 4. Summer Groundfish Survey Positions 2000

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To Dave Kulka From Jeff Hutchings
Co. DFO Co.
Dept. Phone # Phone #
Fax # 772-4105 Fax #

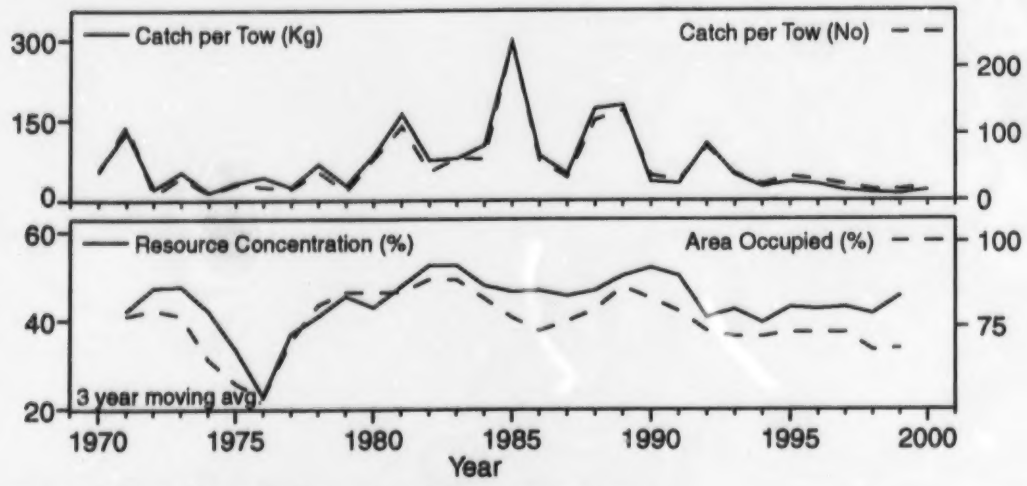

Fig. 5. 4Vn Cod stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

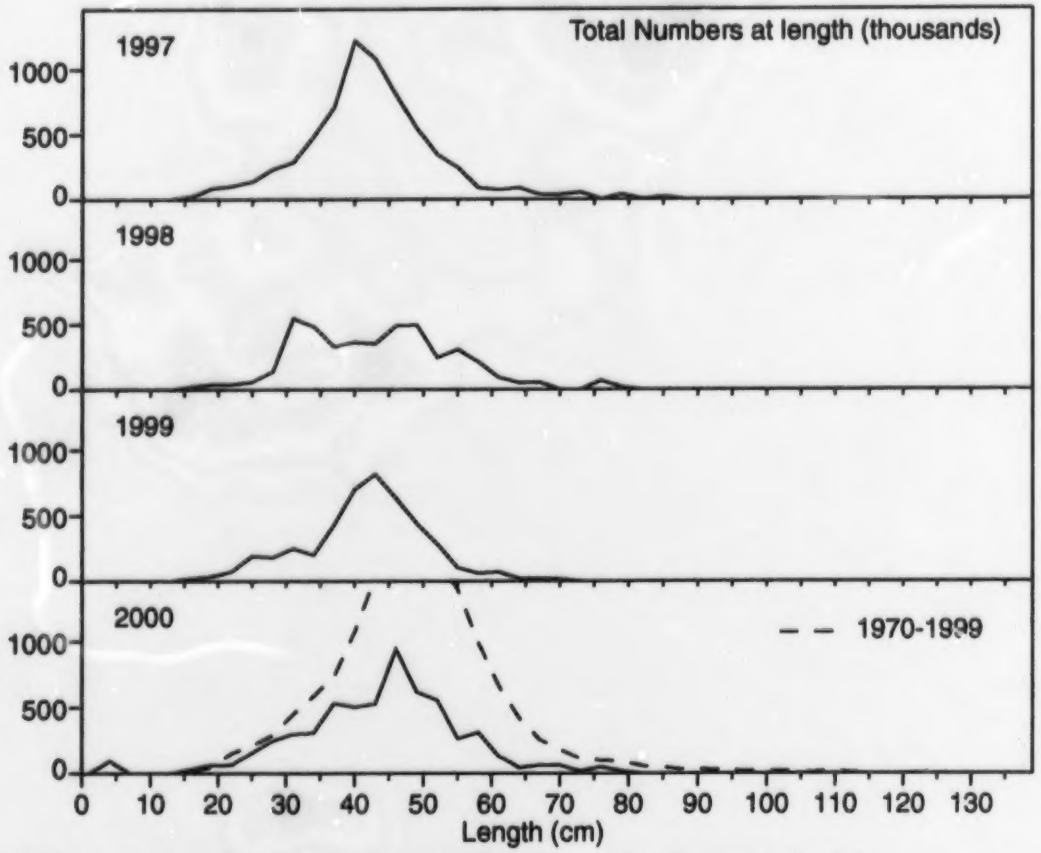

Fig. 6. 4Vn Cod length frequency distribution from the Summer surveys.

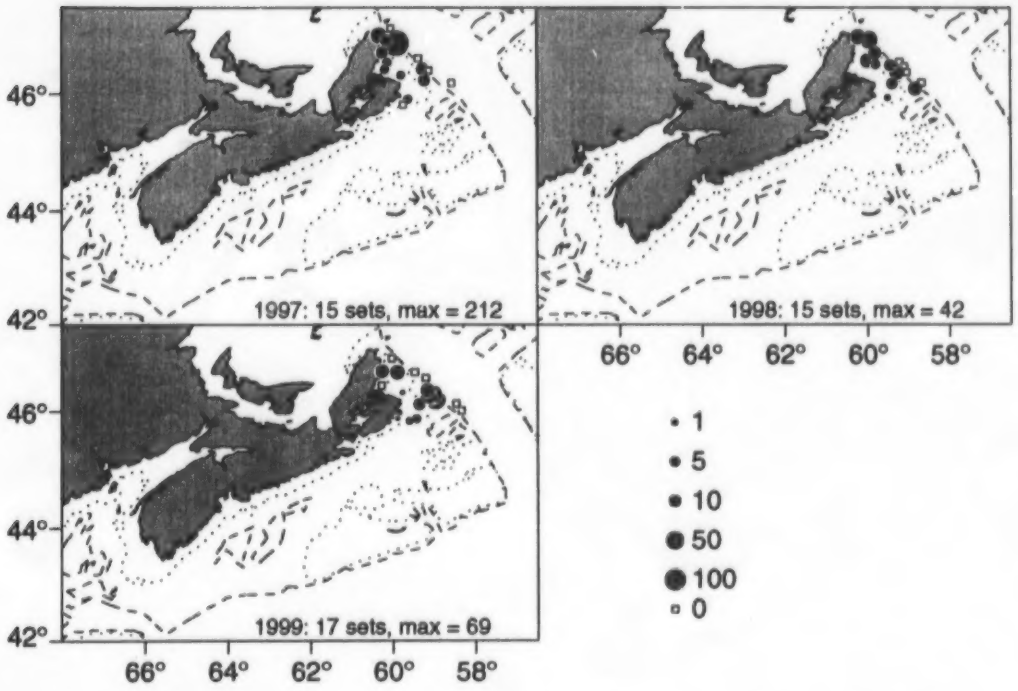

Fig. 7. 4Vn Cod Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

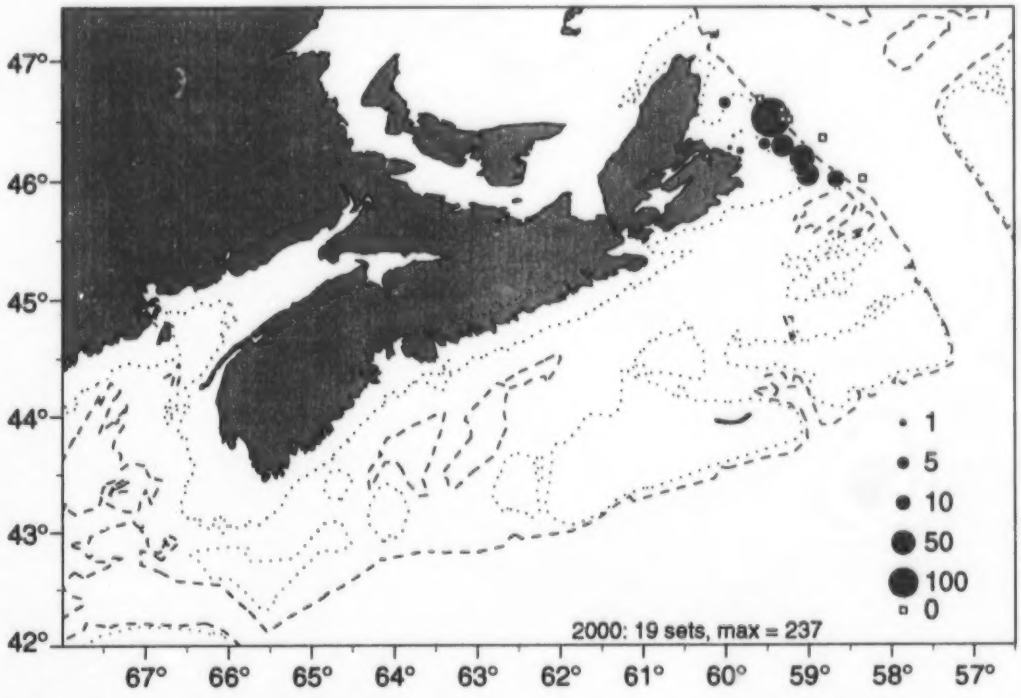

Fig. 8. 4Vn Cod Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

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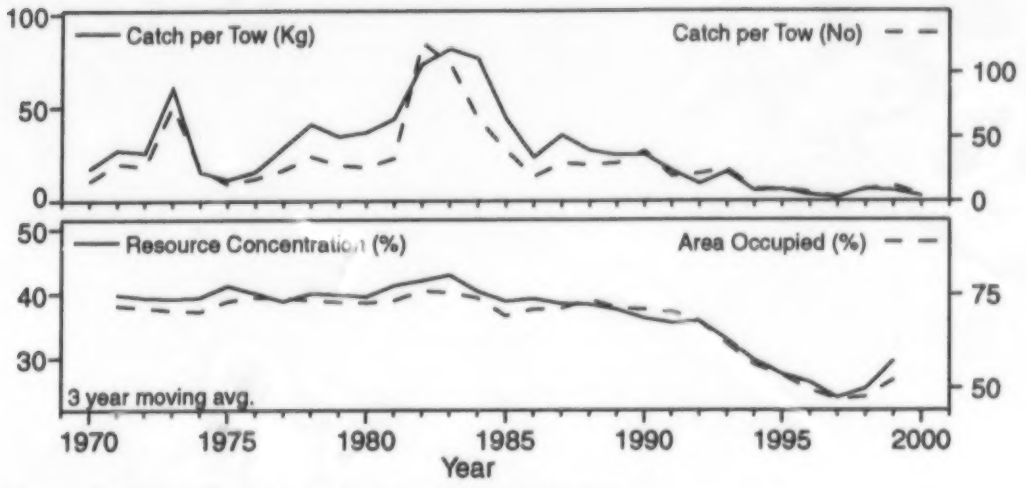

Fig. 9. 4VsW Cod stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

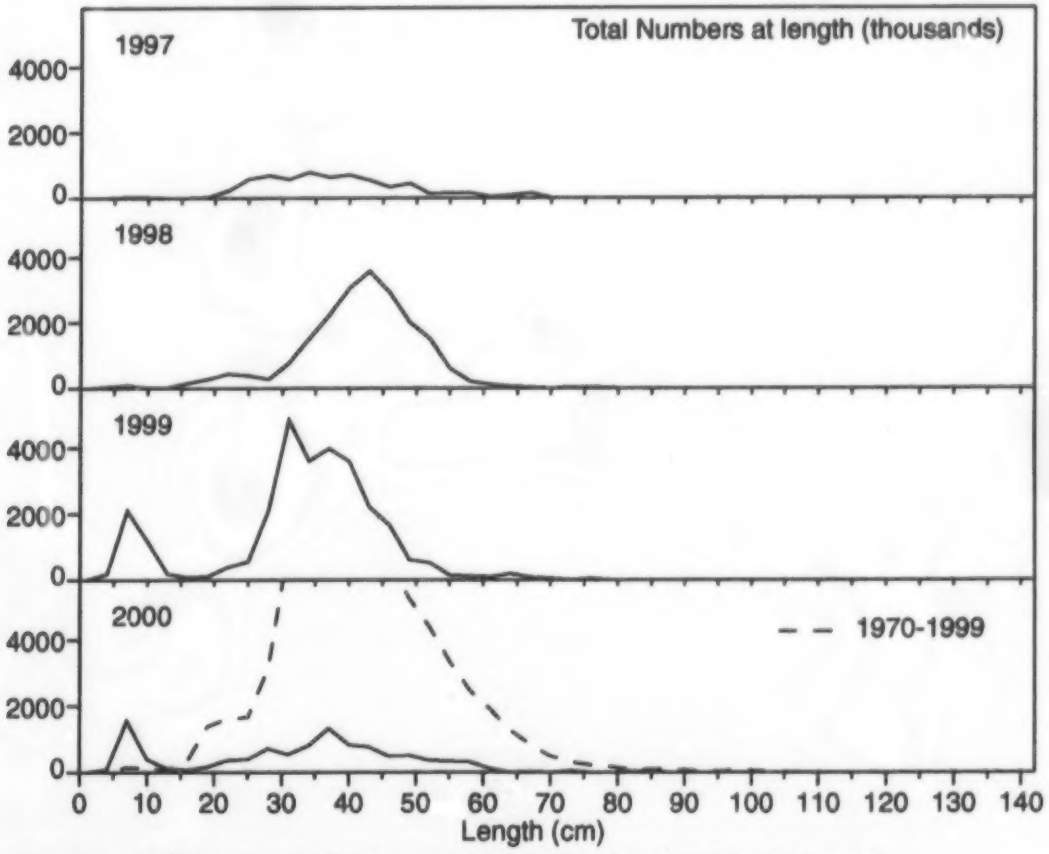

Fig. 10. 4VsW Cod length frequency distribution from the Summer surveys.

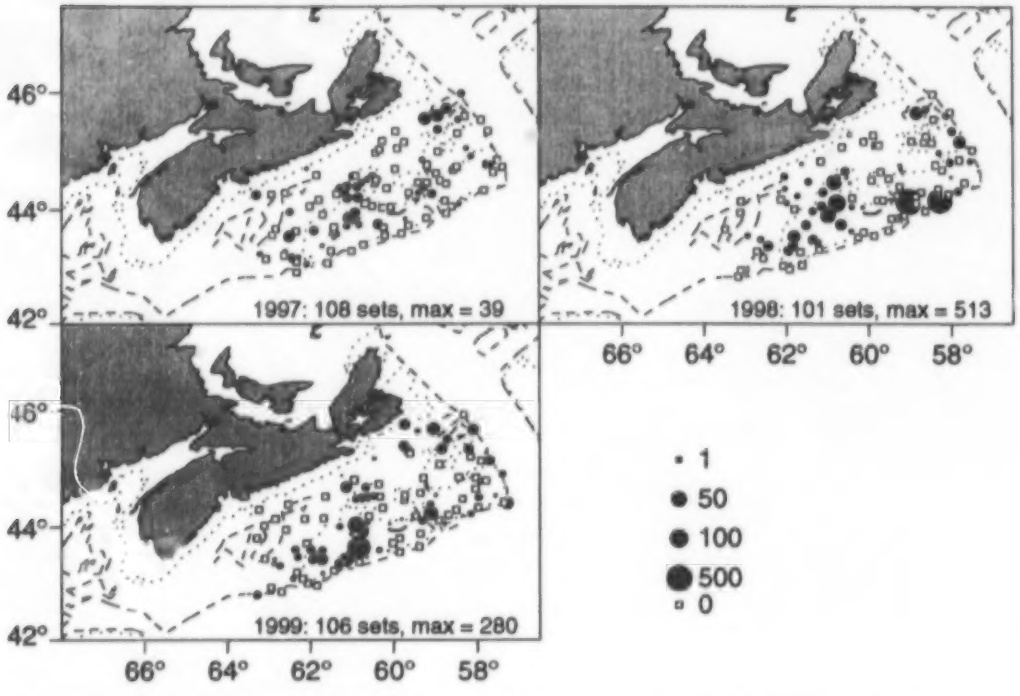

Fig. 11. 4VsW Cod Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

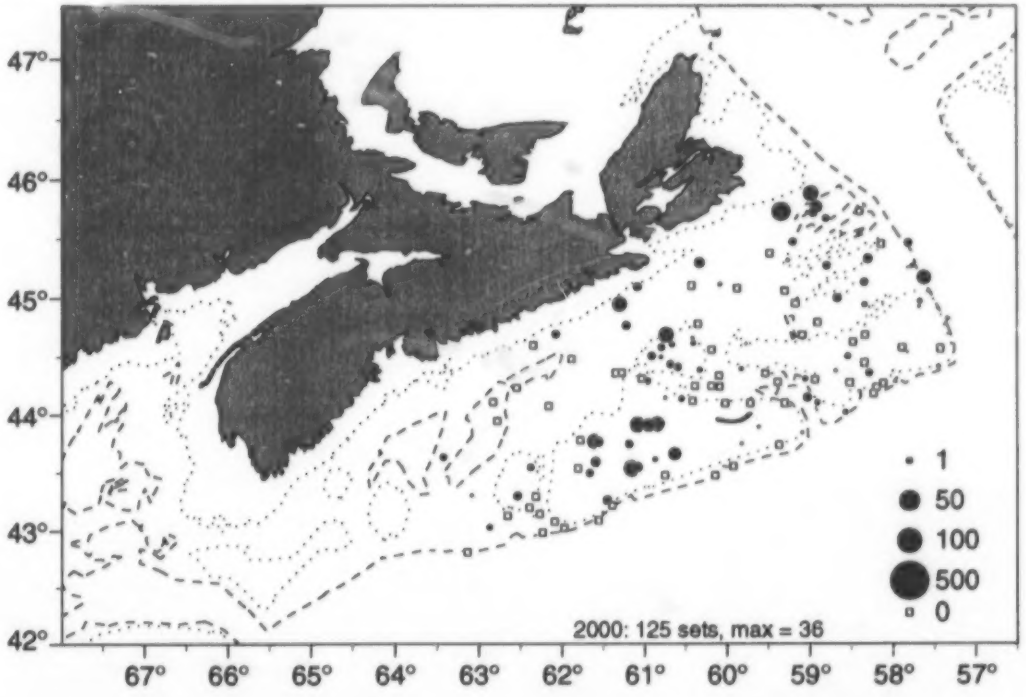

Fig. 12. 4VsW Cod Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

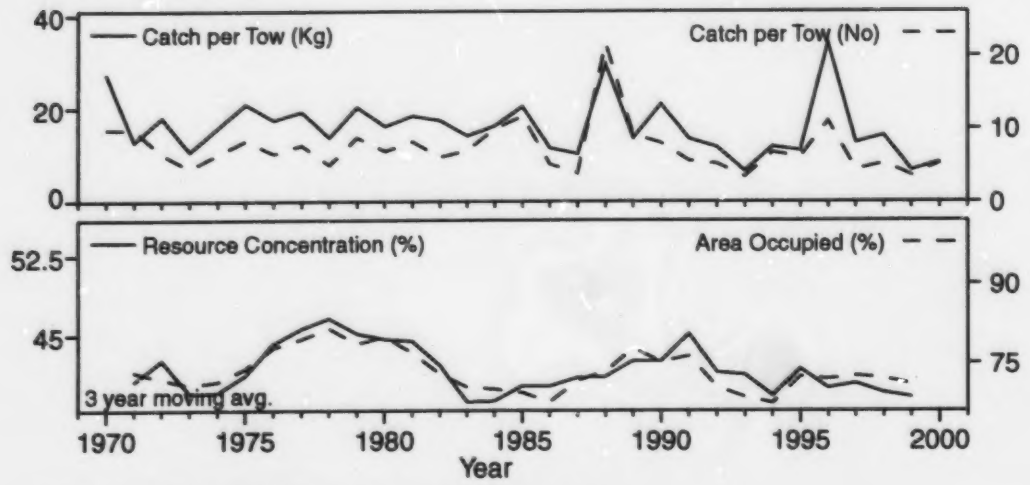

Fig. 13. 4X Cod stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

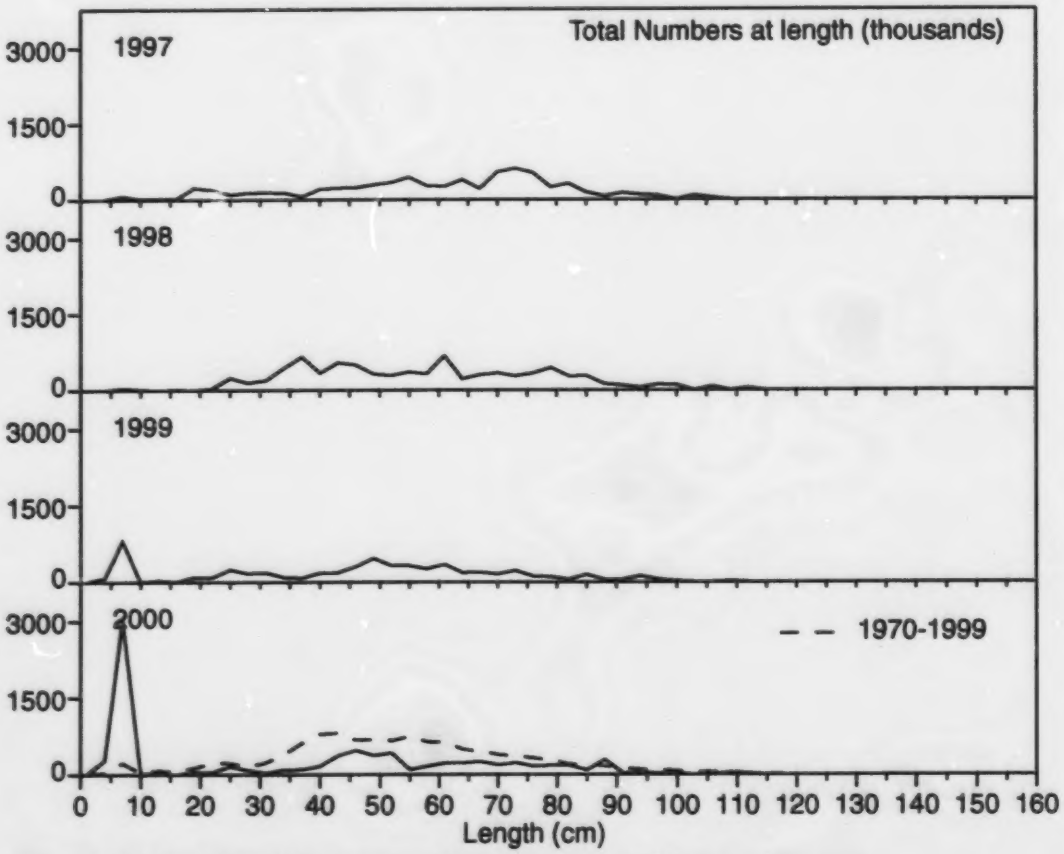

Fig. 14. 4X Cod length frequency distribution from the Summer surveys.

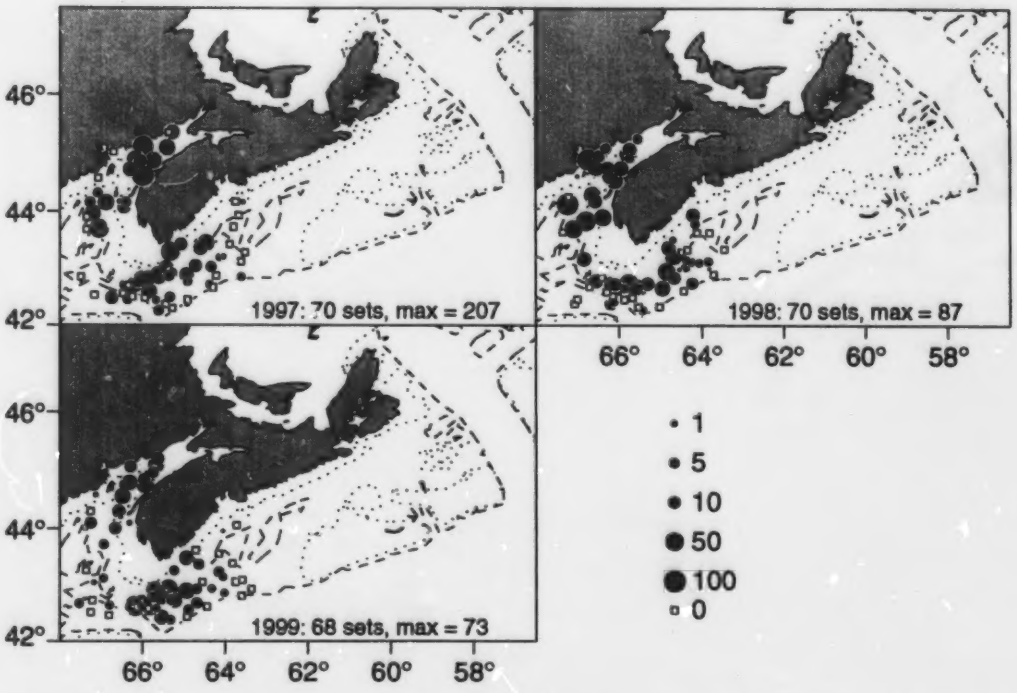

Fig. 15. 4X Cod Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

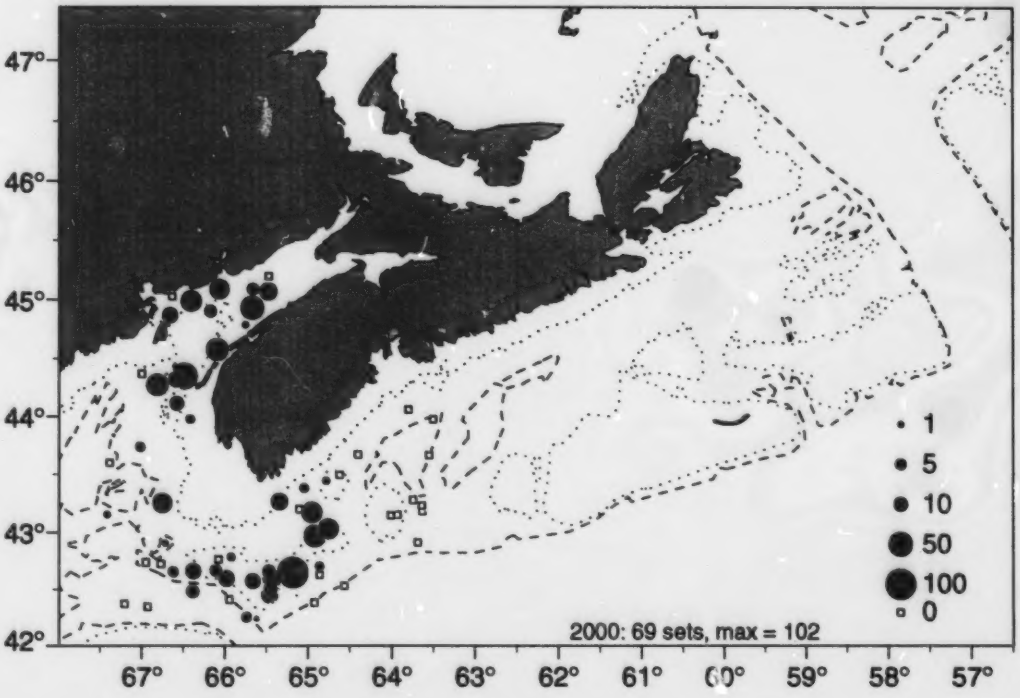

Fig. 16. 4X Cod Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

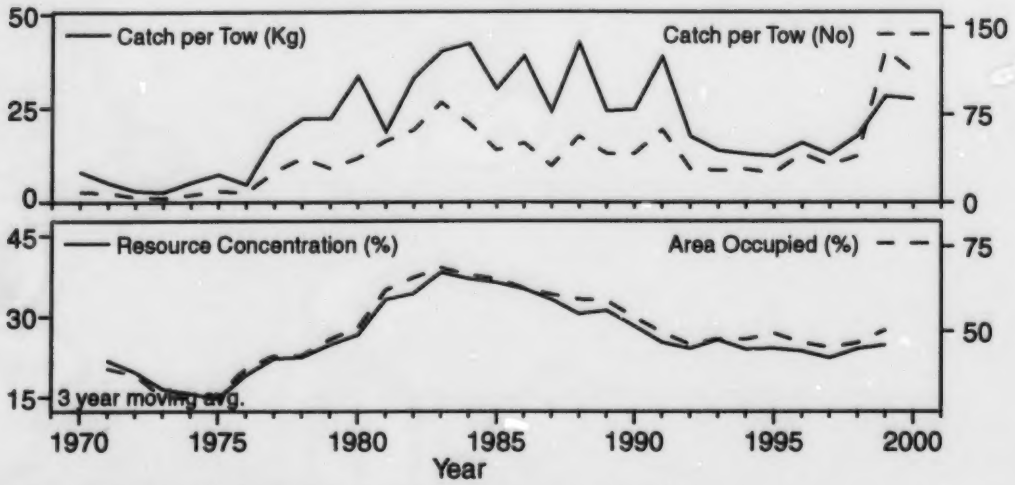

Fig. 17. 4VW Haddock stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

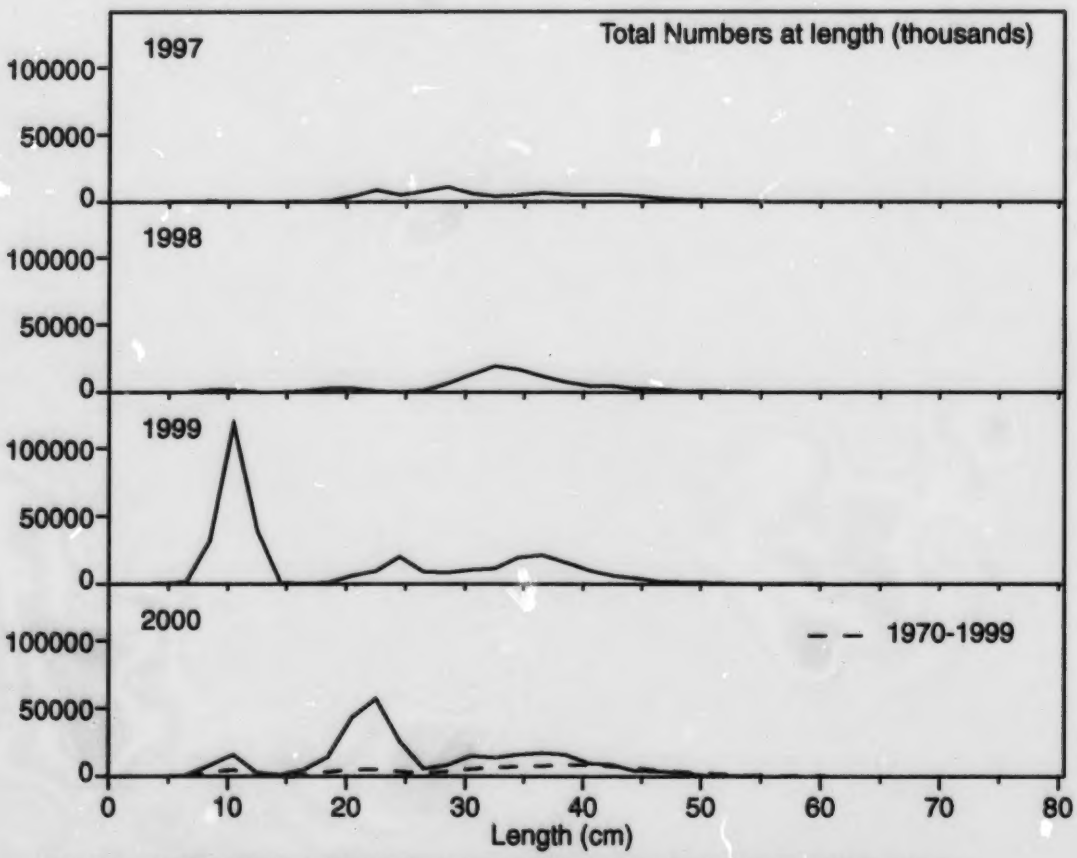

Fig. 18. 4VW Haddock length frequency distribution from the Summer surveys.

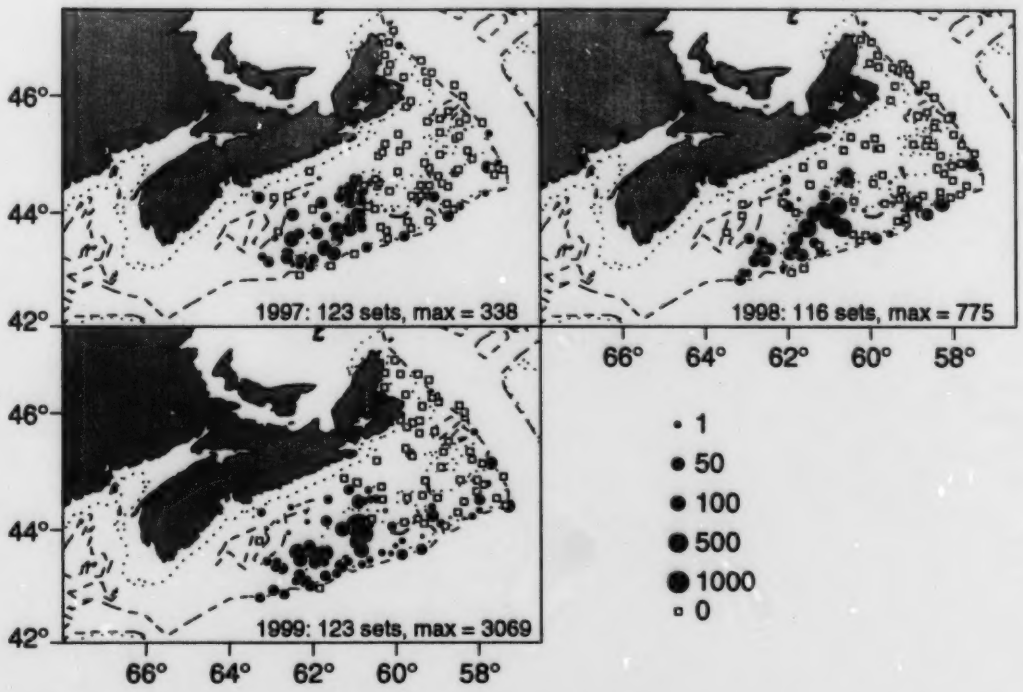

Fig. 19. 4VW Haddock Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

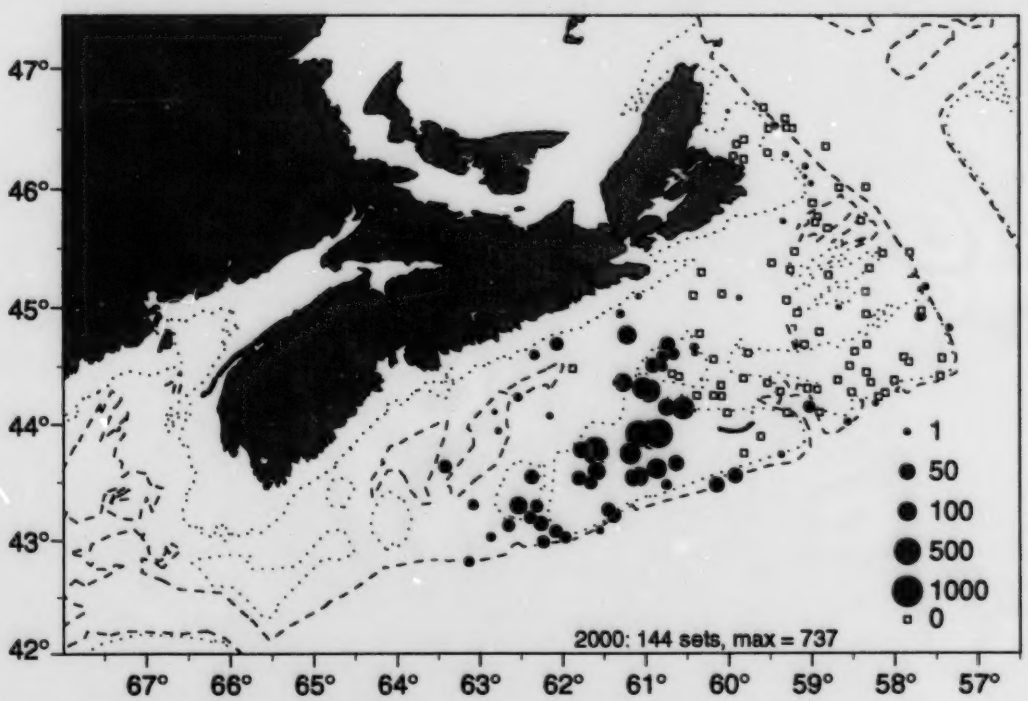

Fig. 20. 4VW Haddock Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

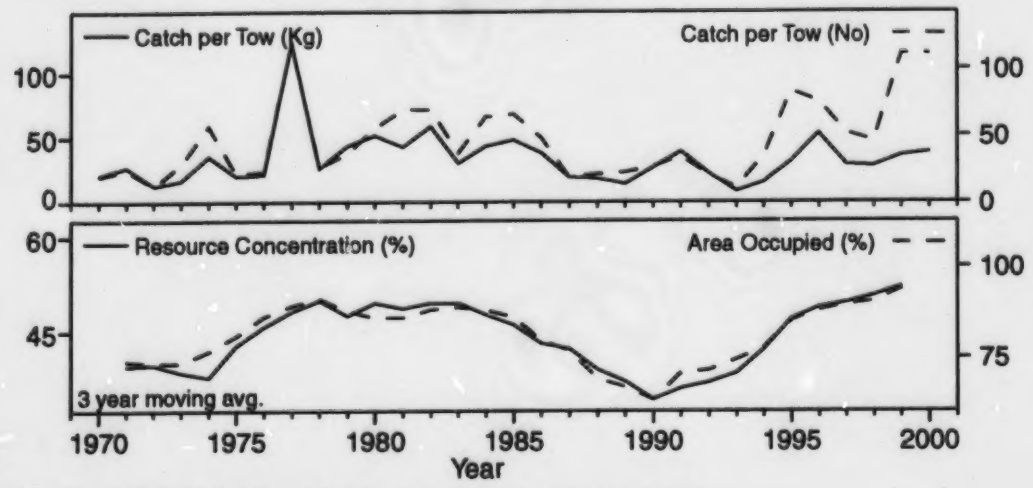

Fig. 21. 4X Haddock stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

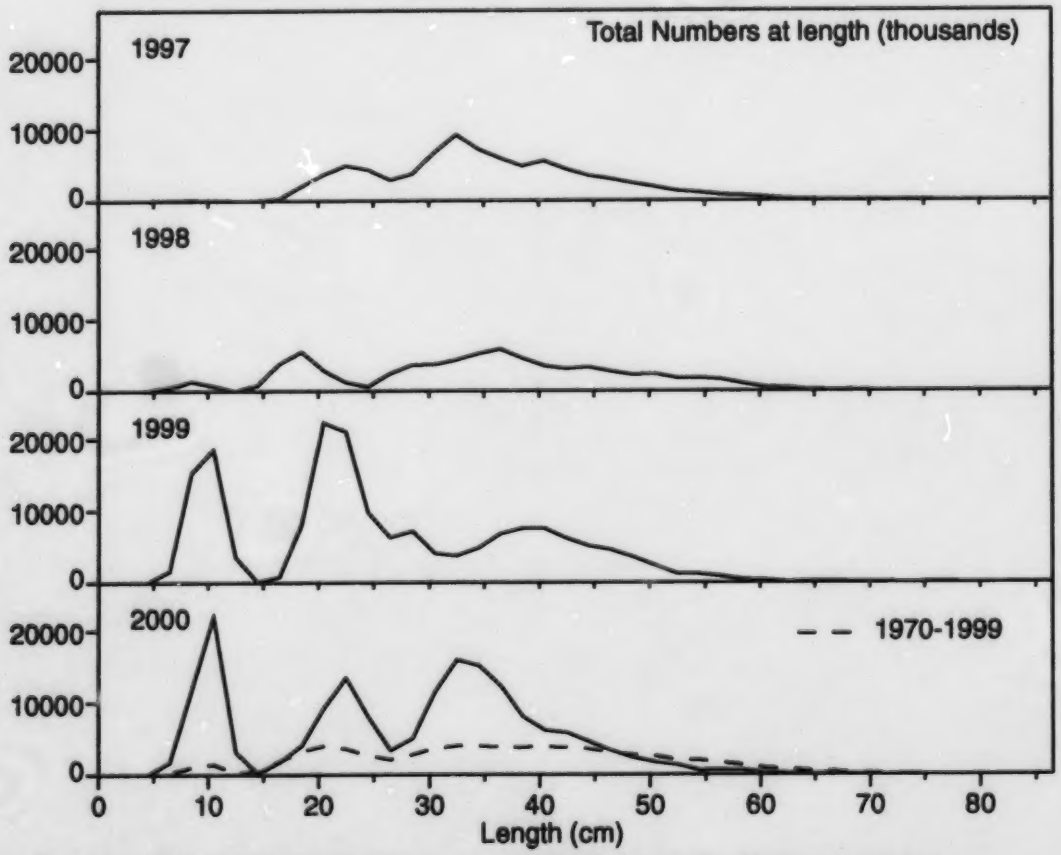

Fig. 22. 4X Haddock length frequency distribution from the Summer surveys.

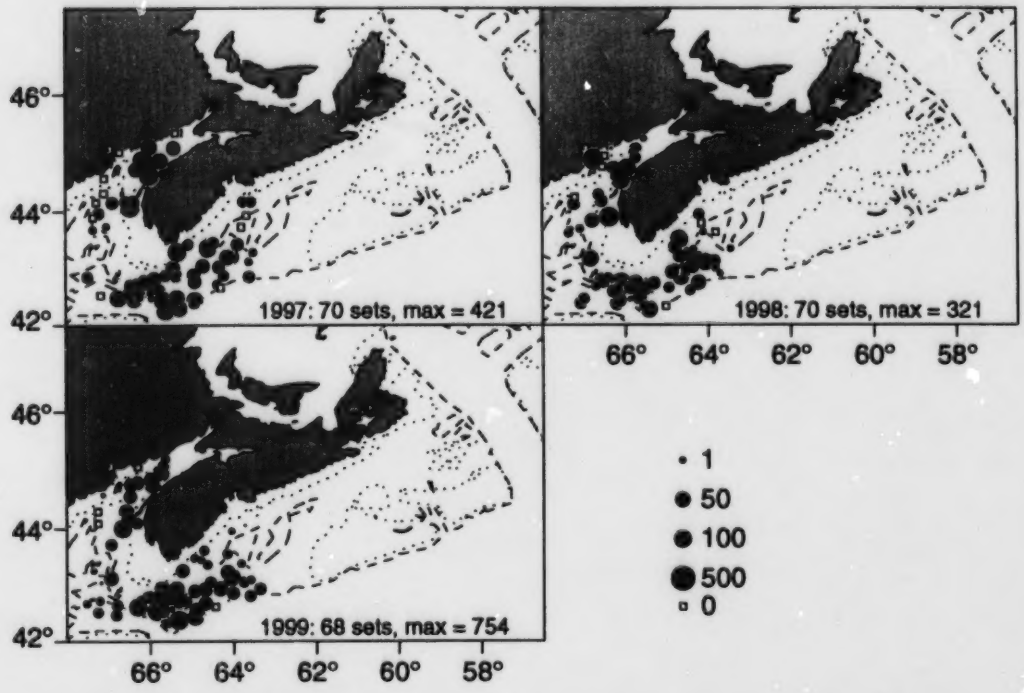

Fig. 23. 4X Haddock Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

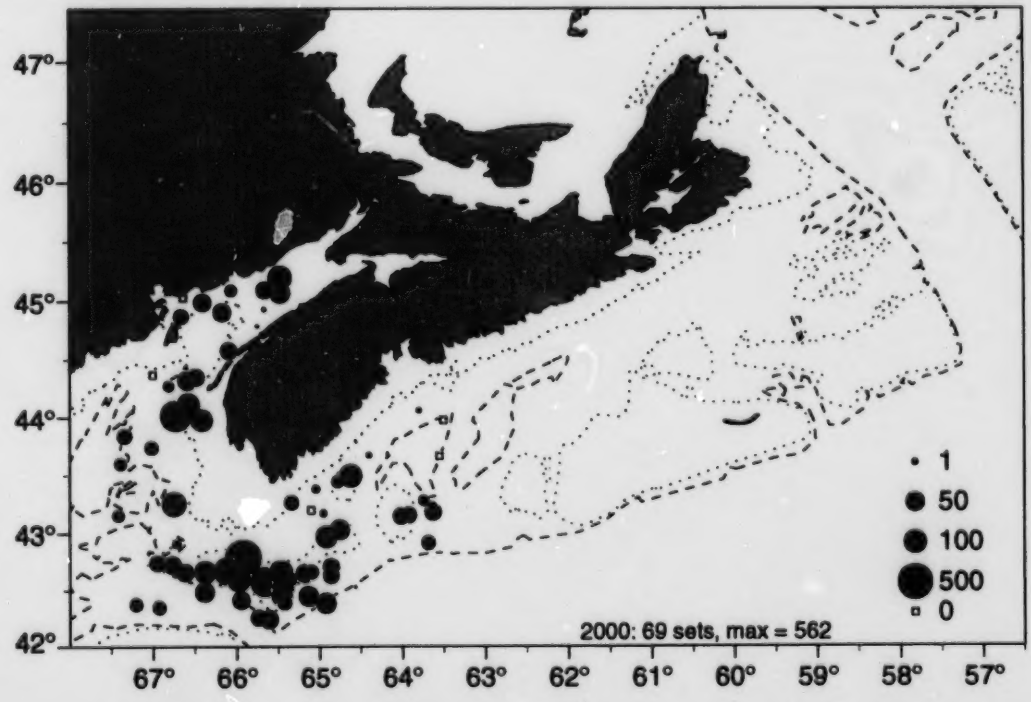

Fig. 24. 4X Haddock Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

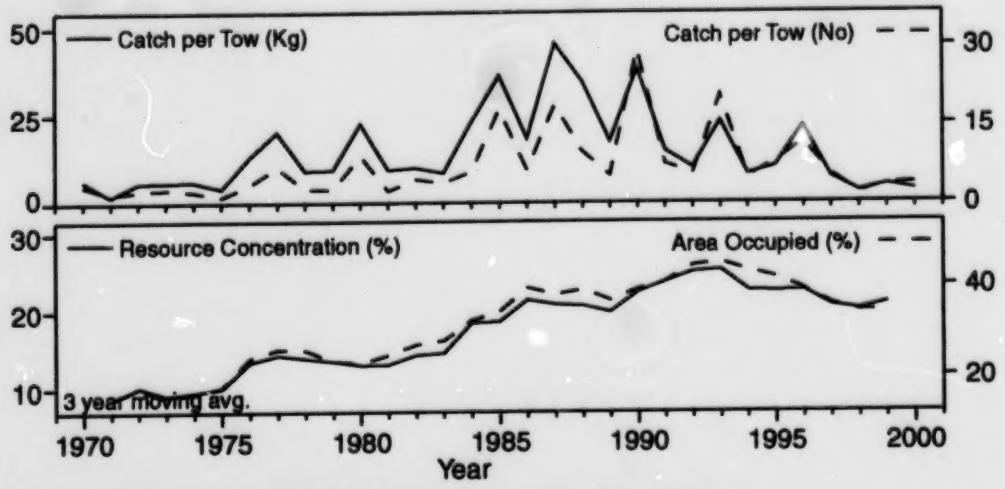

Fig. 25. 4VWX Pollock stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

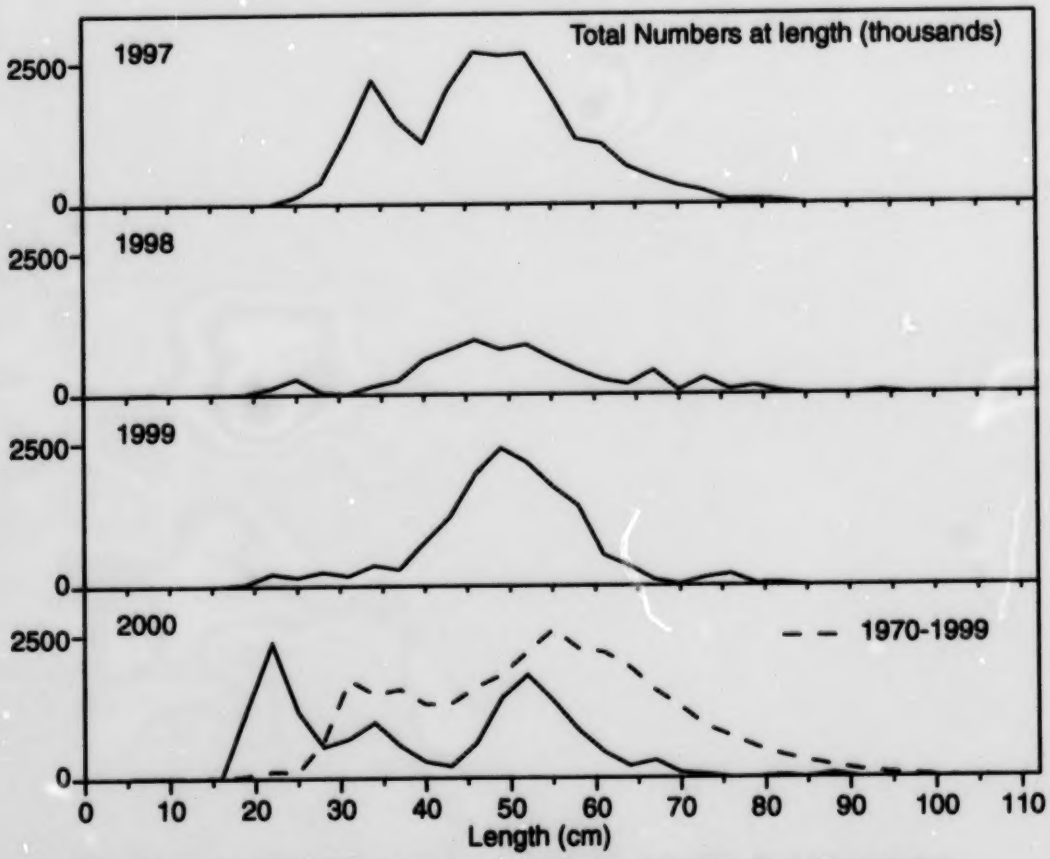

Fig. 26. 4VWX Pollock length frequency distribution from the Summer surveys.

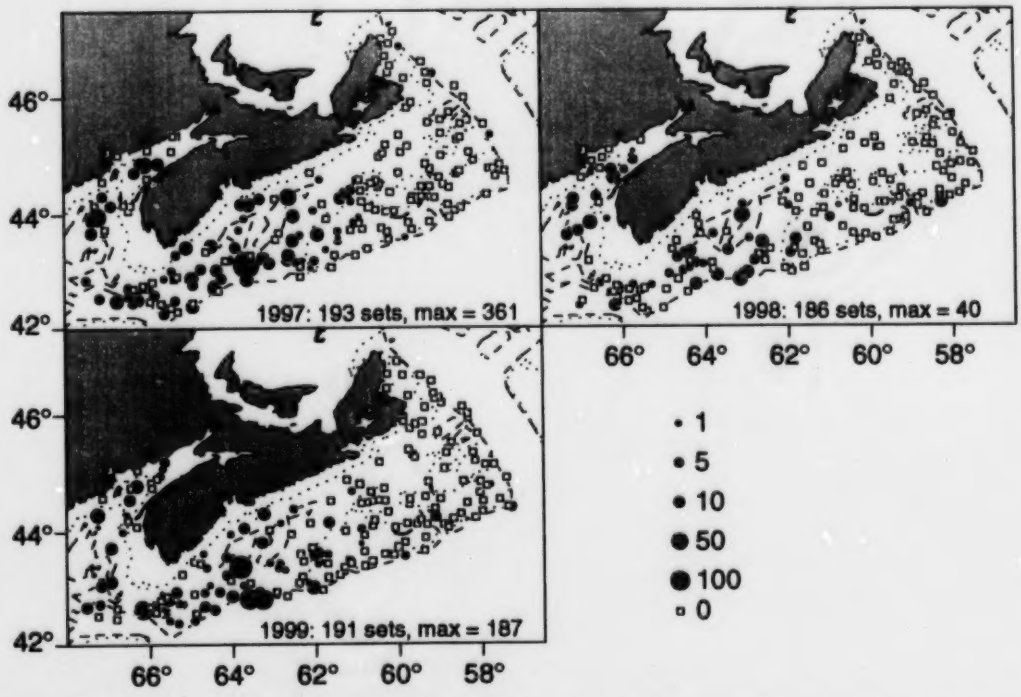

Fig. 27. 4VWX Pollock Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

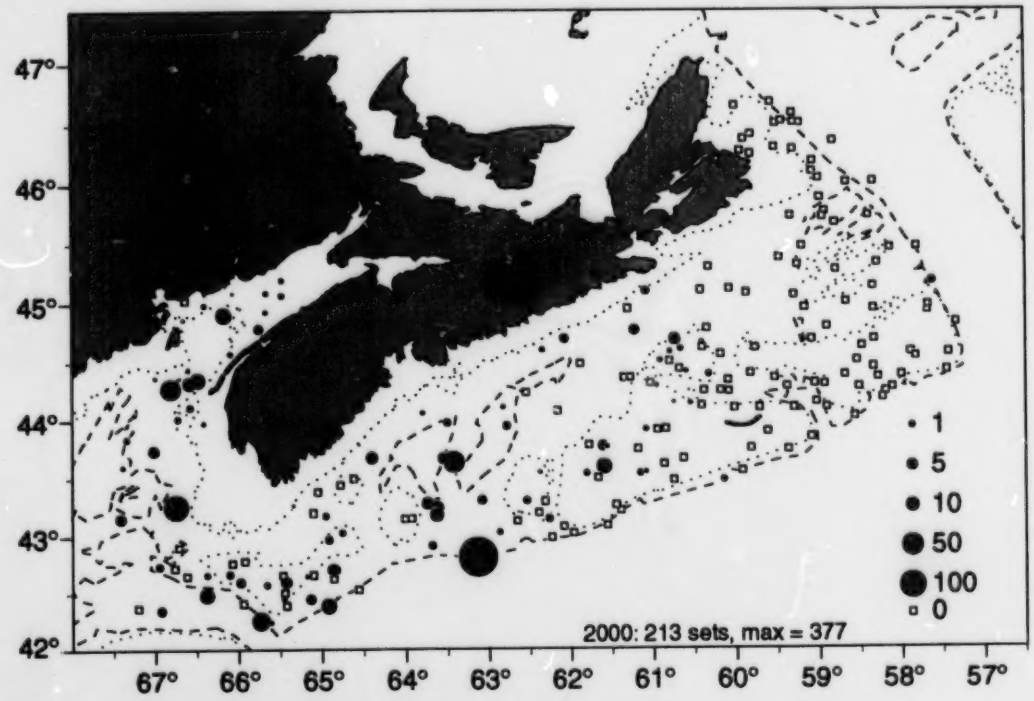

Fig. 28. 4VWX Pollock Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

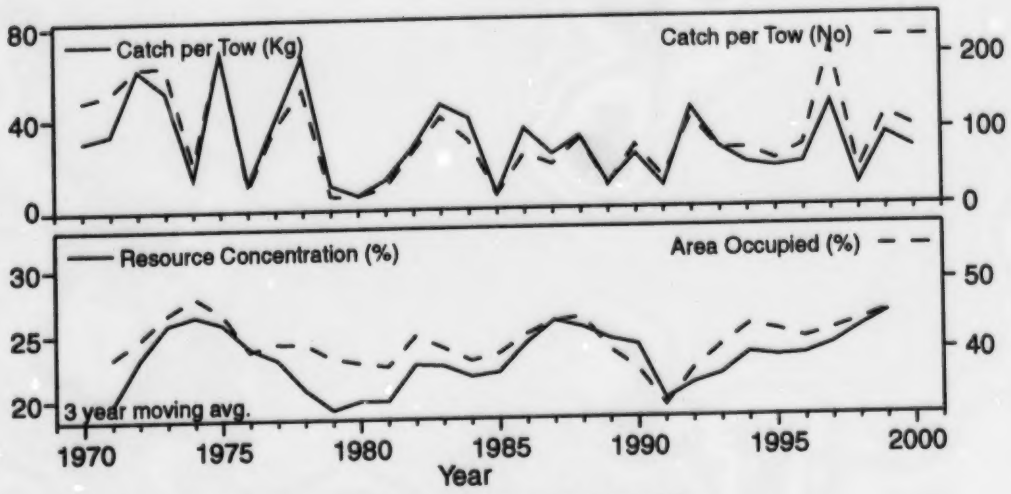

Fig. 29. Unit3 Redfish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

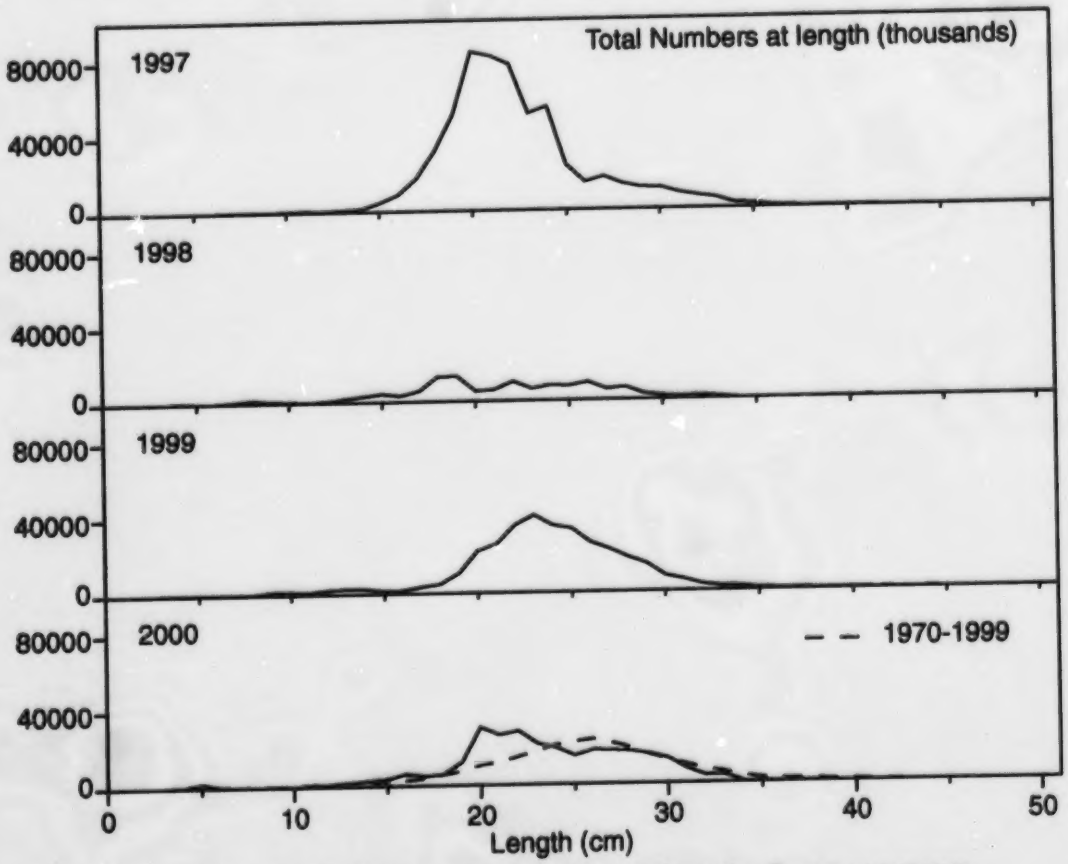

Fig. 30. Unit3 Redfish length frequency distribution from the Summer surveys.

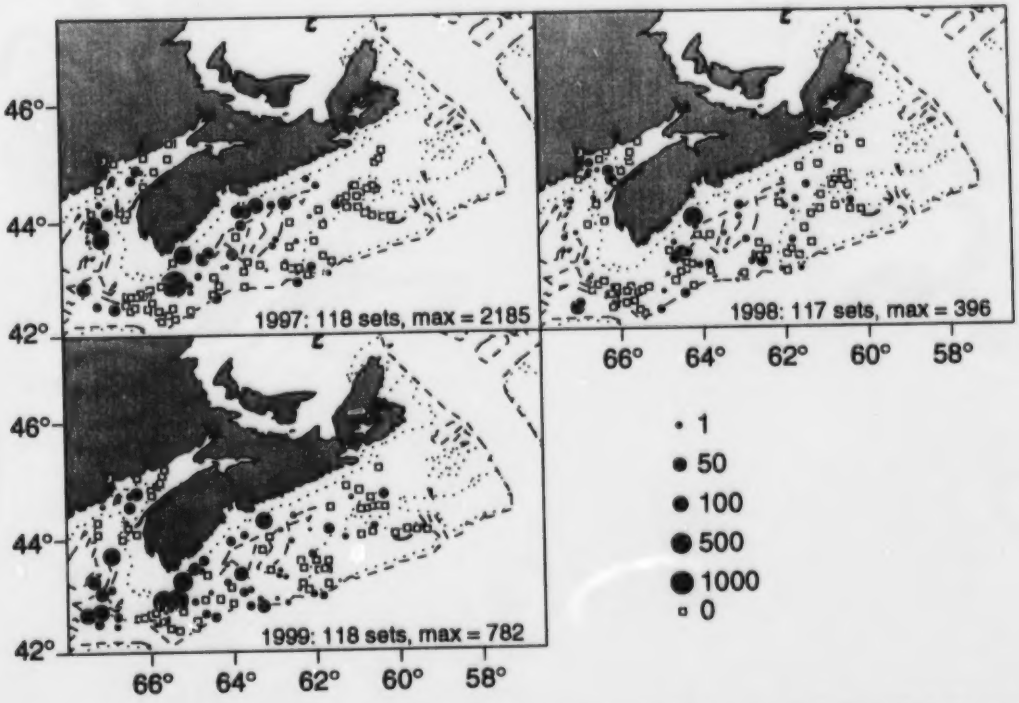

Fig. 31. Unit3 Redfish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

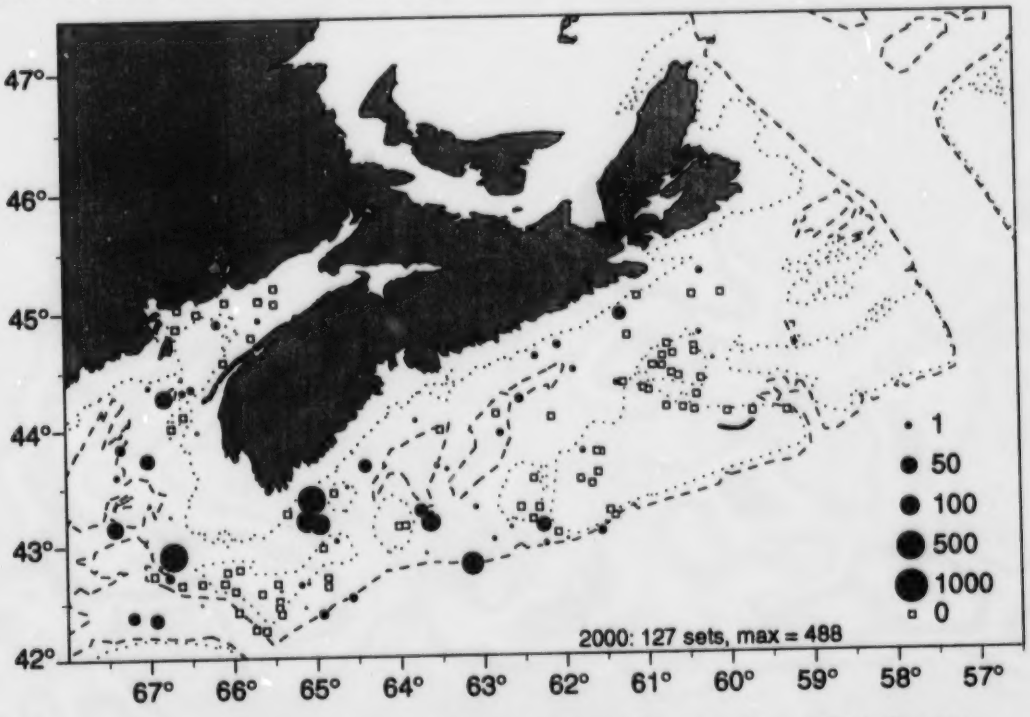

Fig. 32. Unit3 Redfish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

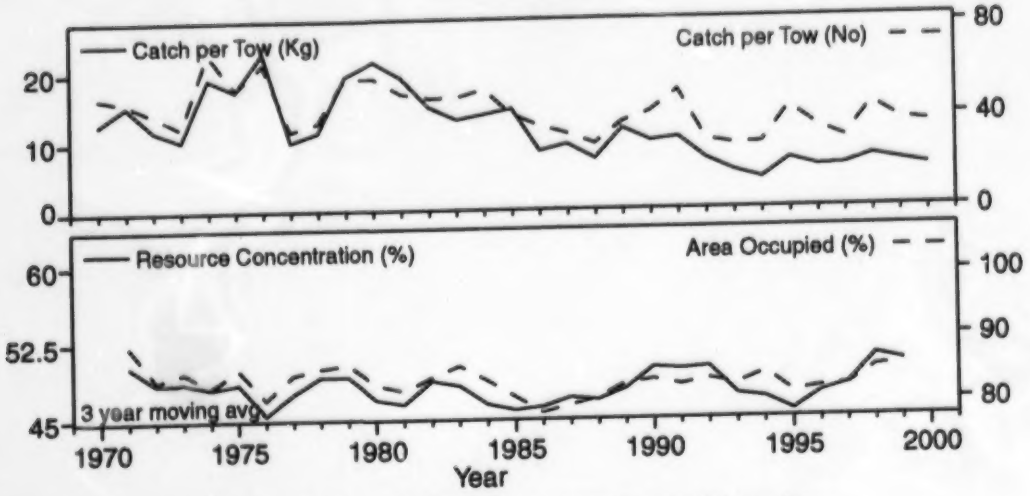

Fig. 33. 4VW American Plaice stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

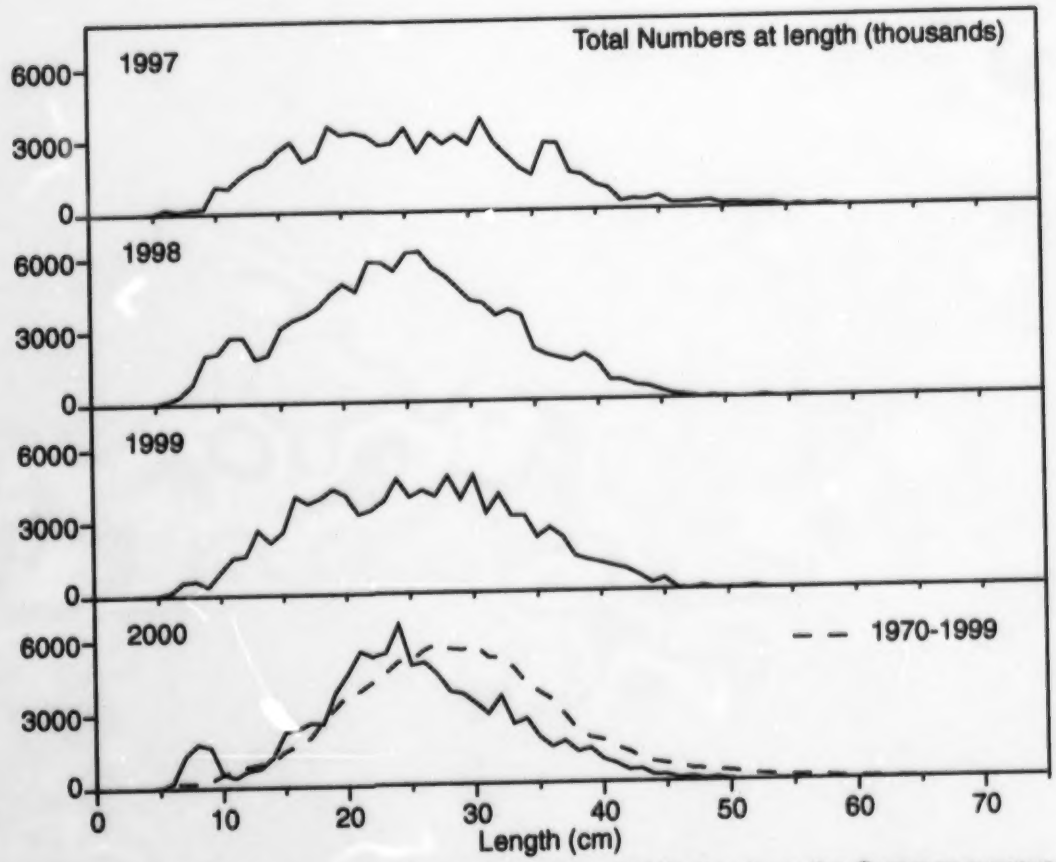

Fig. 34. 4VW American Plaice length frequency distribution from the Summer surveys.

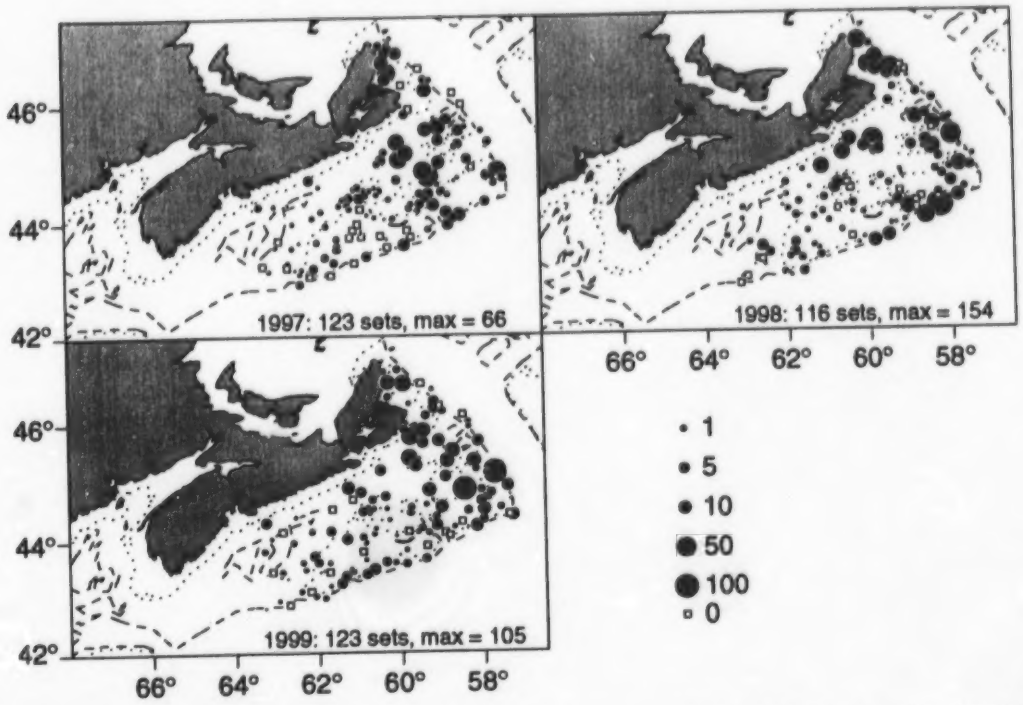

Fig. 35. 4VW American Plaice Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

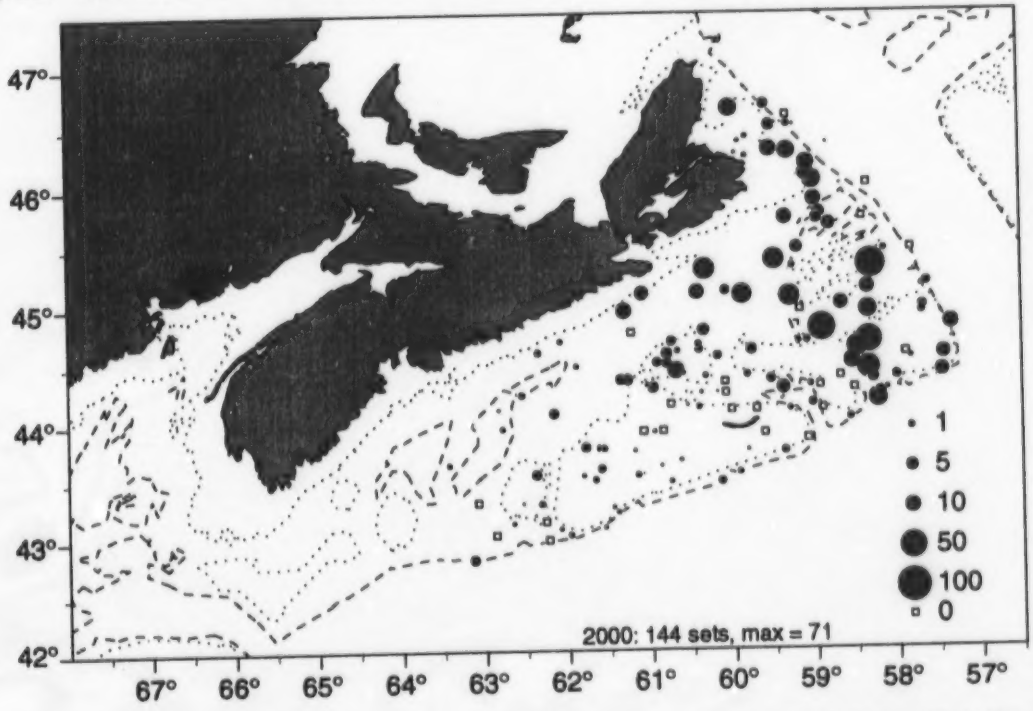

Fig. 36. 4VW American Plaice Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

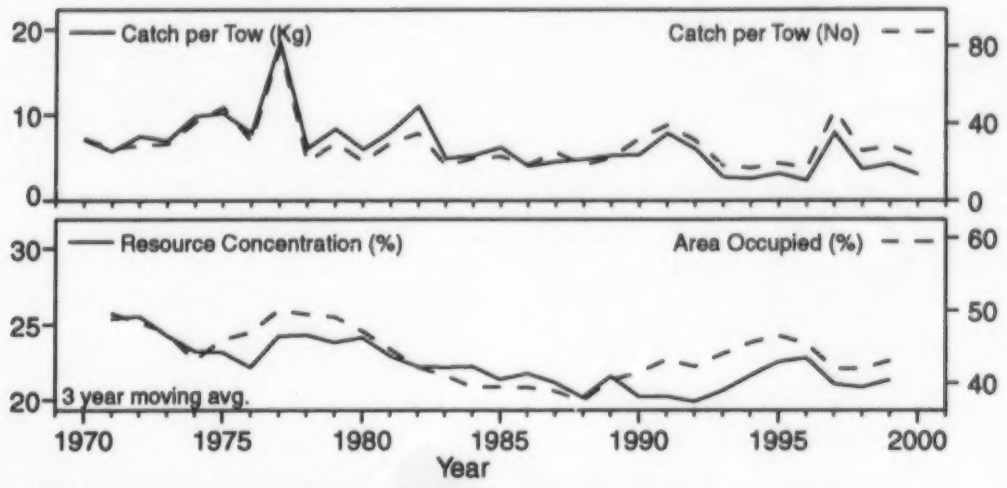

Fig. 37. 4VW Yellowtail Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

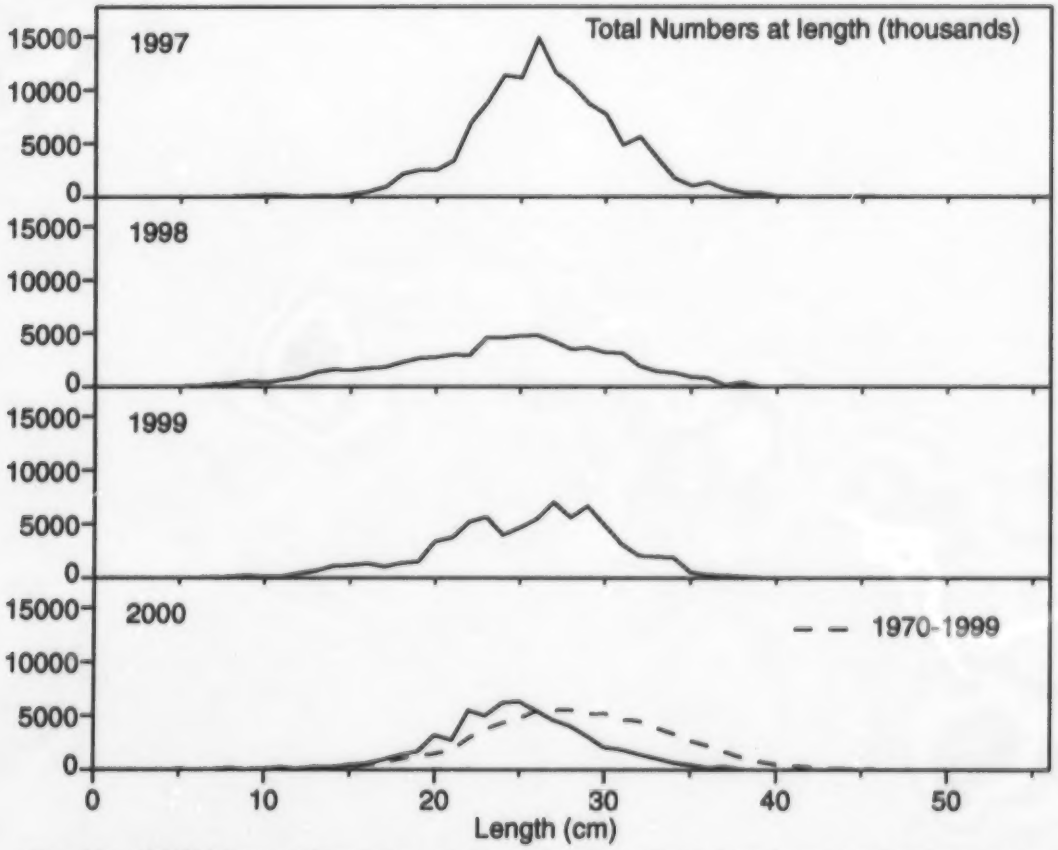

Fig. 38. 4VW Yellowtail Flounder length frequency distribution from the Summer surveys.

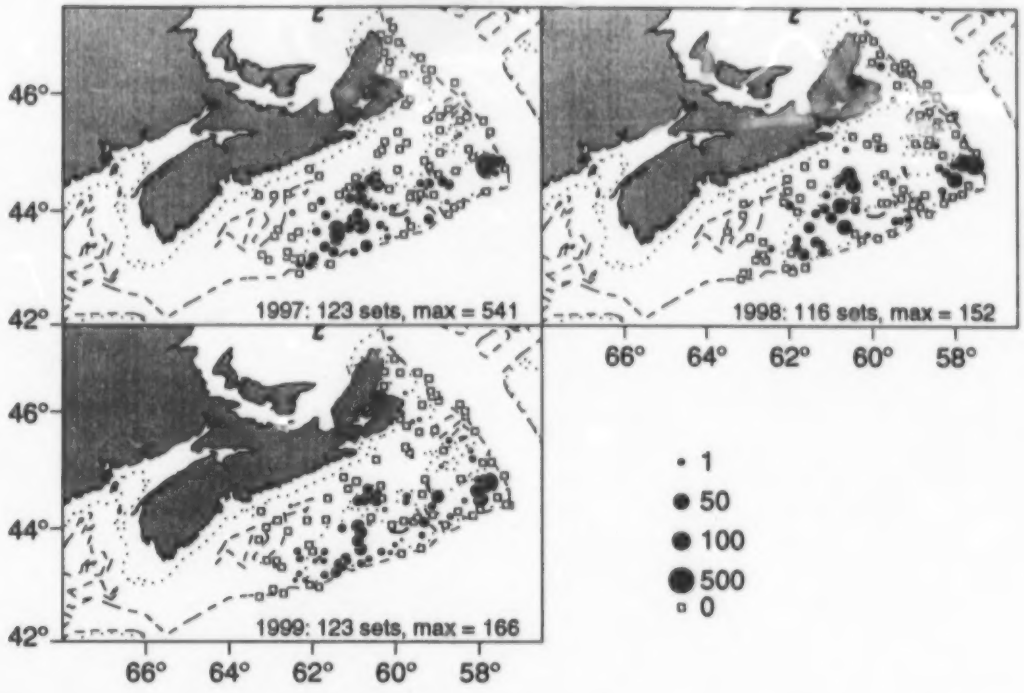

Fig. 39. 4VW Yellowtail Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

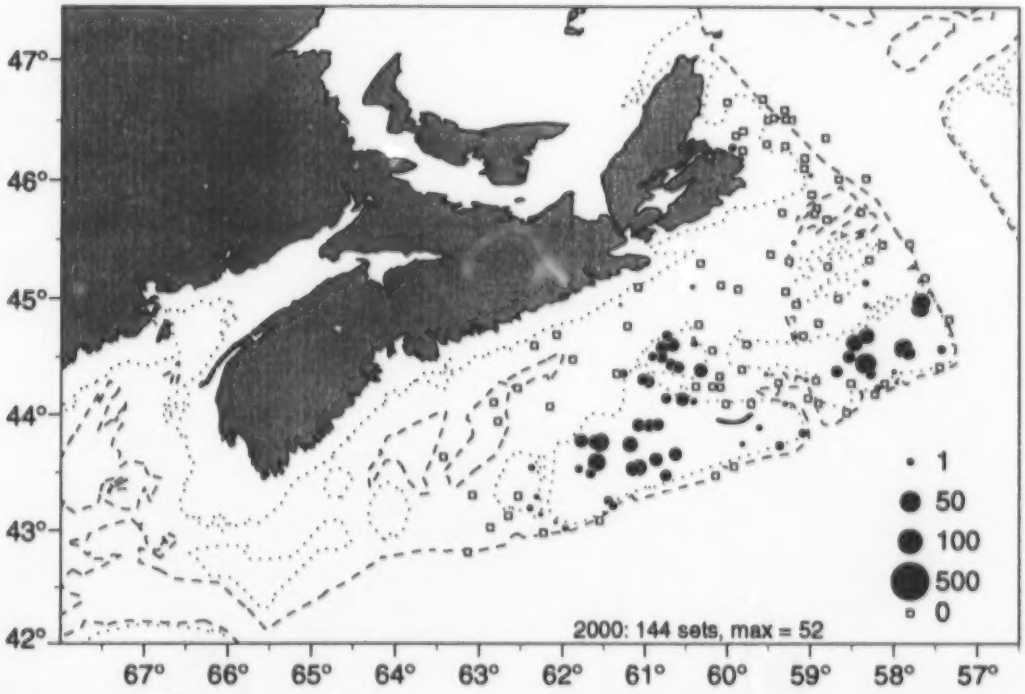

Fig. 40. 4VW Yellowtail Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

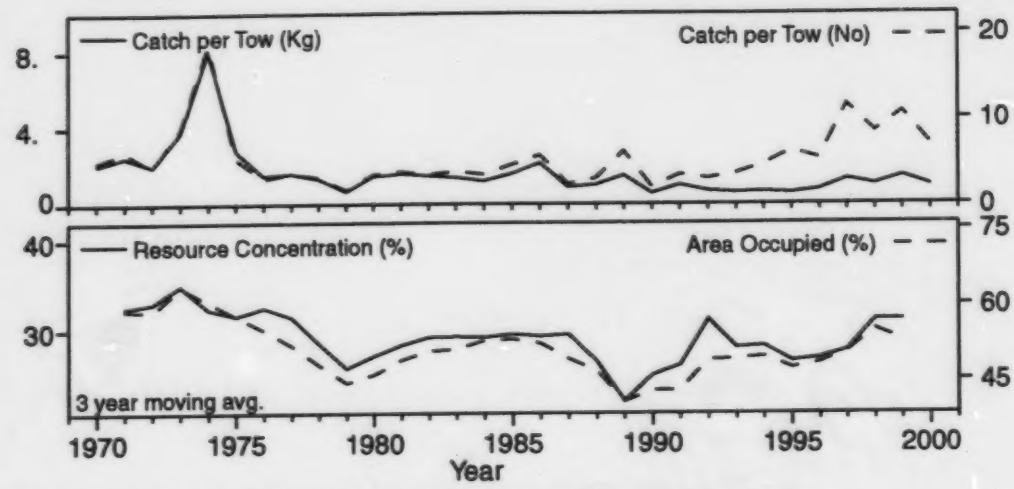

Fig. 41. 4VW Witch Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

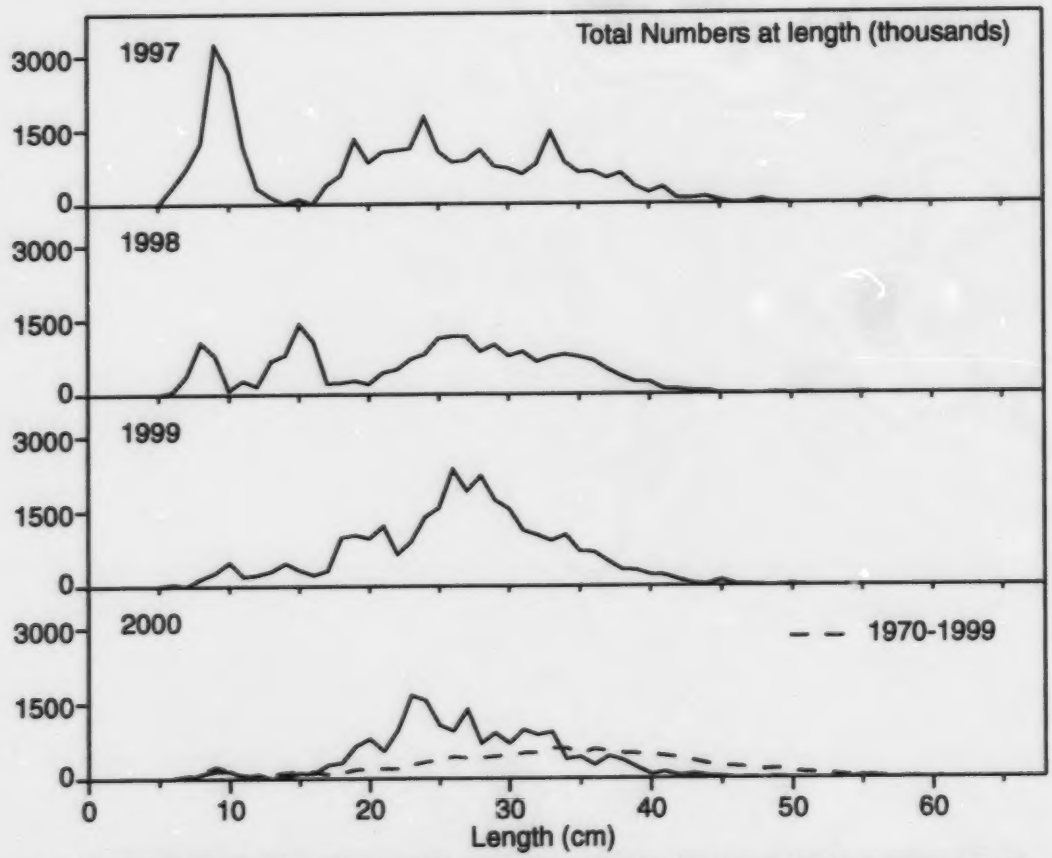

Fig. 42. 4VW Witch Flounder length frequency distribution from the Summer surveys.

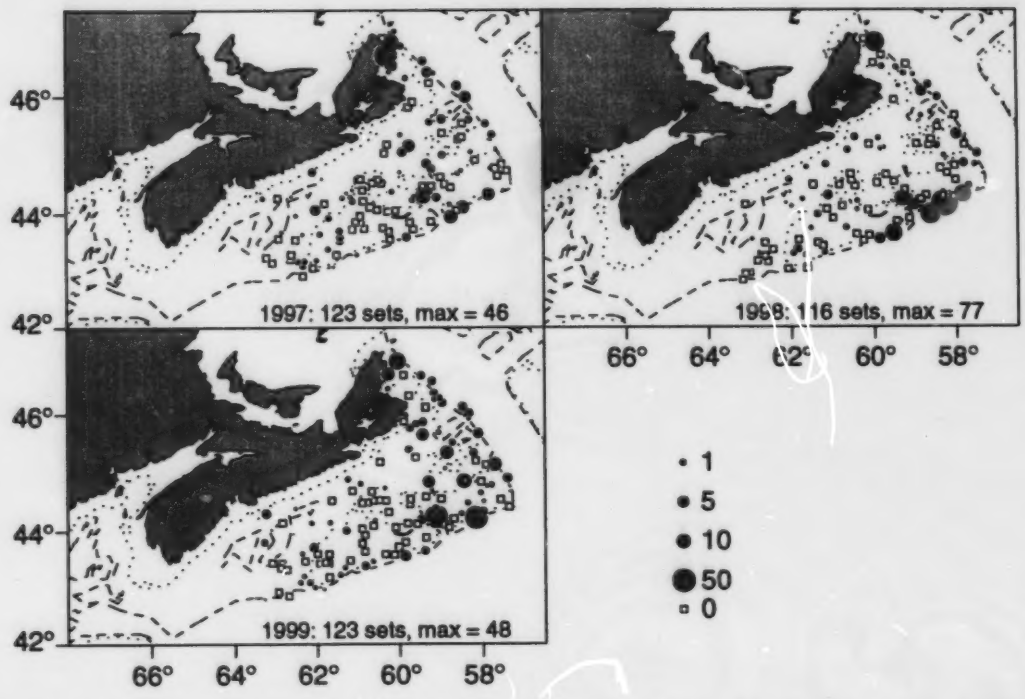

Fig. 43. 4VW Witch Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

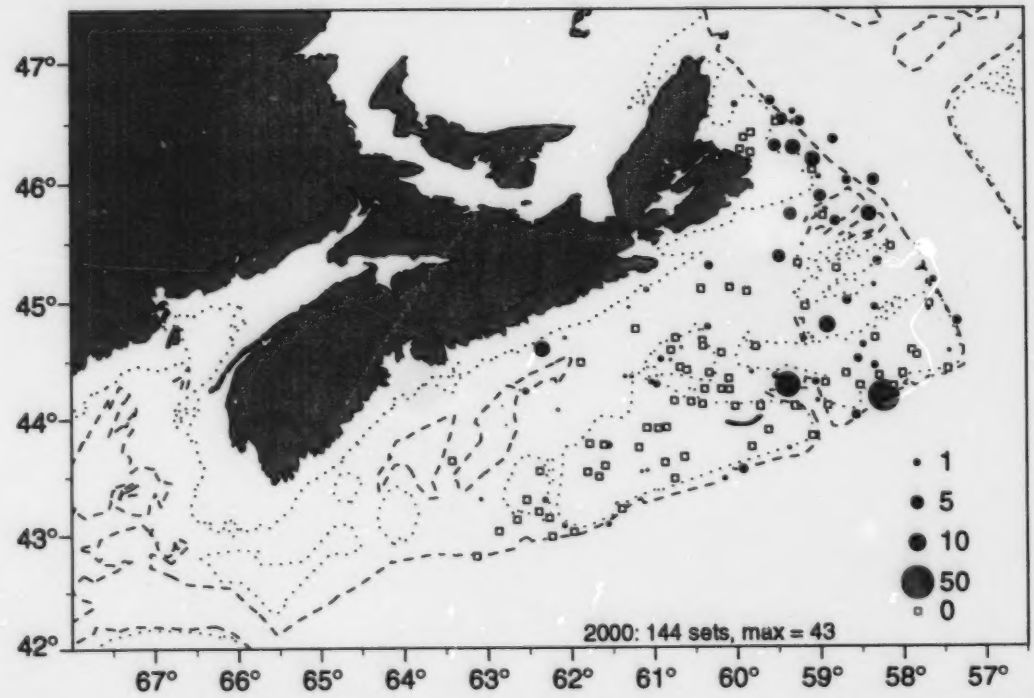

Fig. 44. 4VW Witch Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

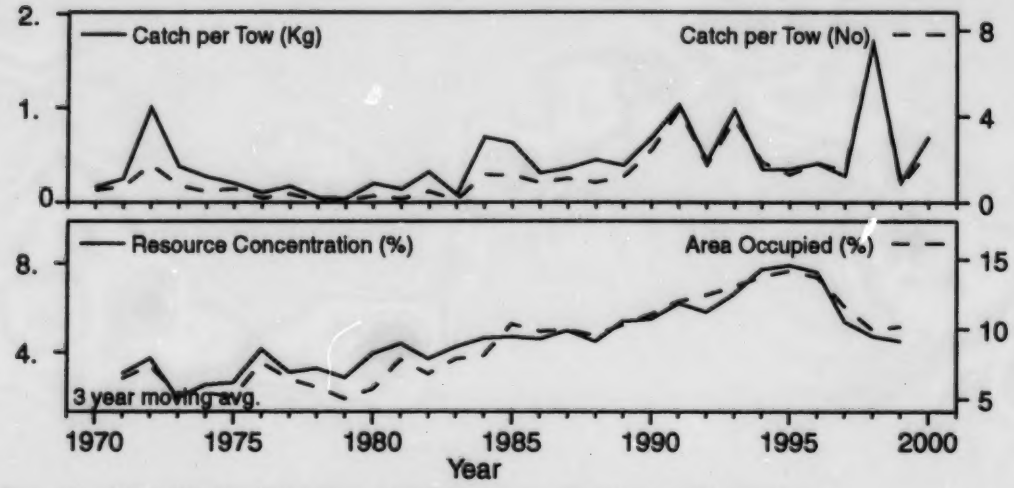

Fig. 45. 4VW Winter Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

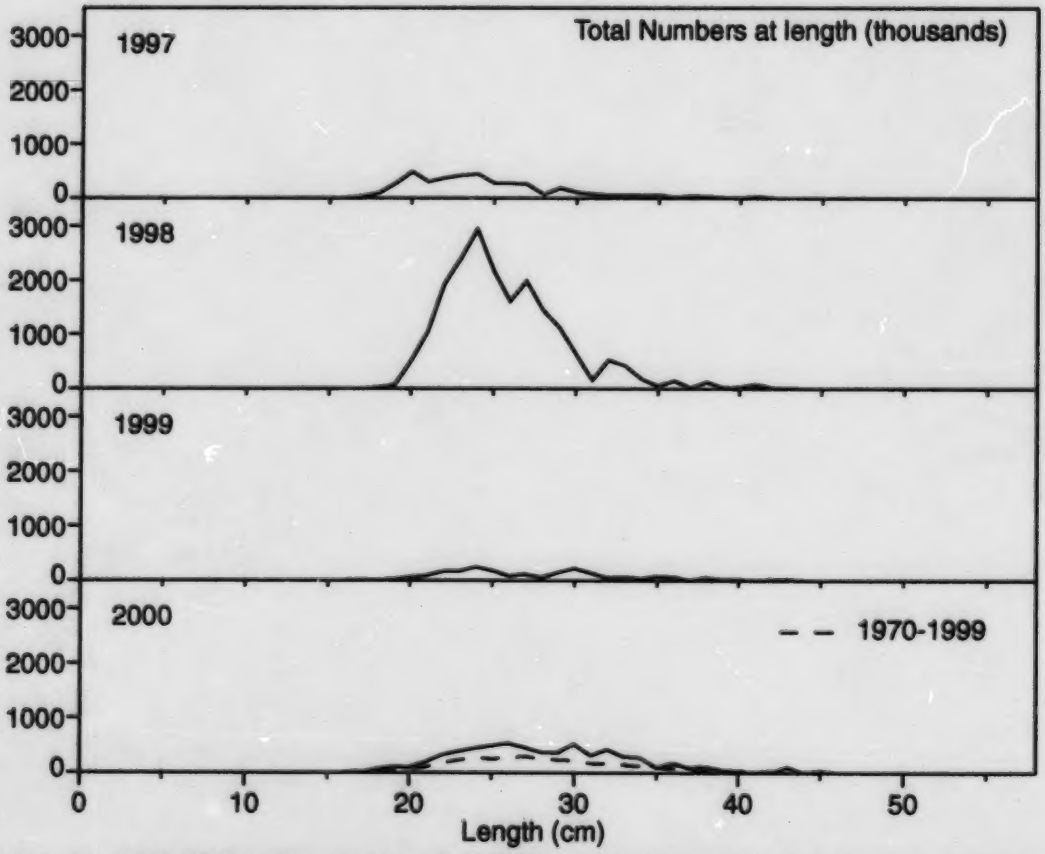

Fig. 46. 4VW Winter Flounder length frequency distribution from the Summer surveys.

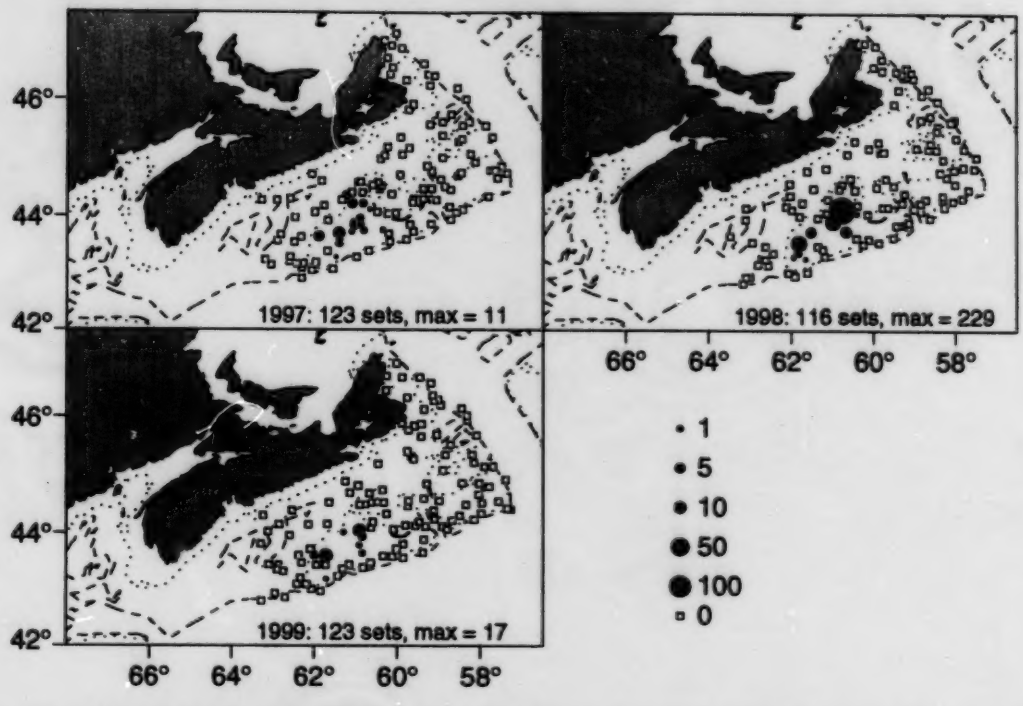

Fig. 47. 4VW Winter Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

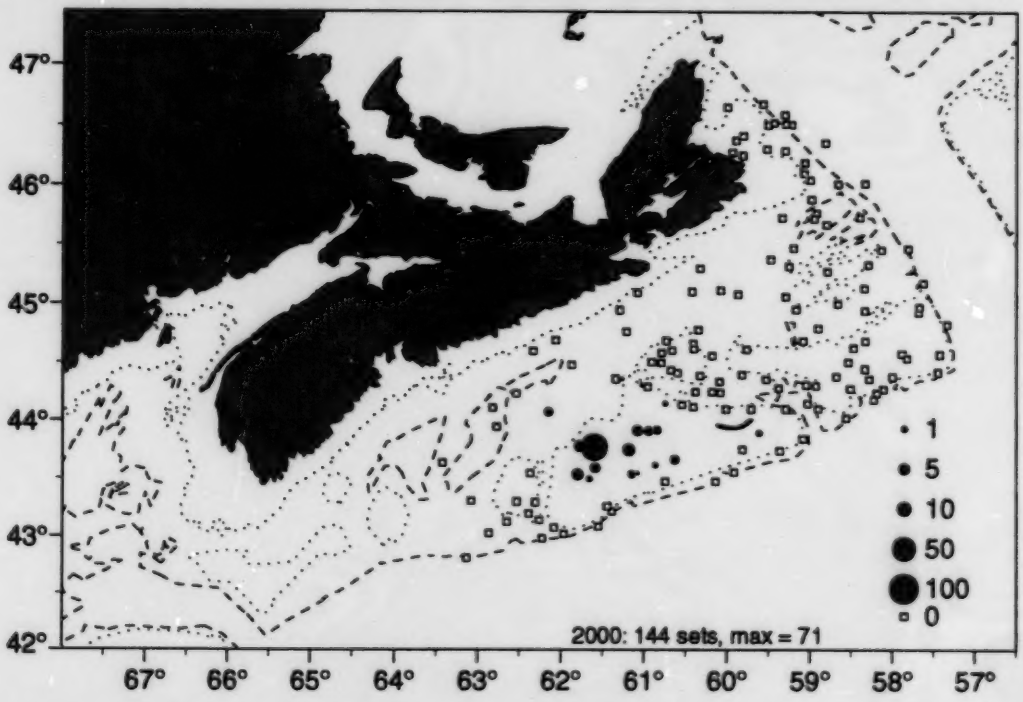

Fig. 48. 4VW Winter Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

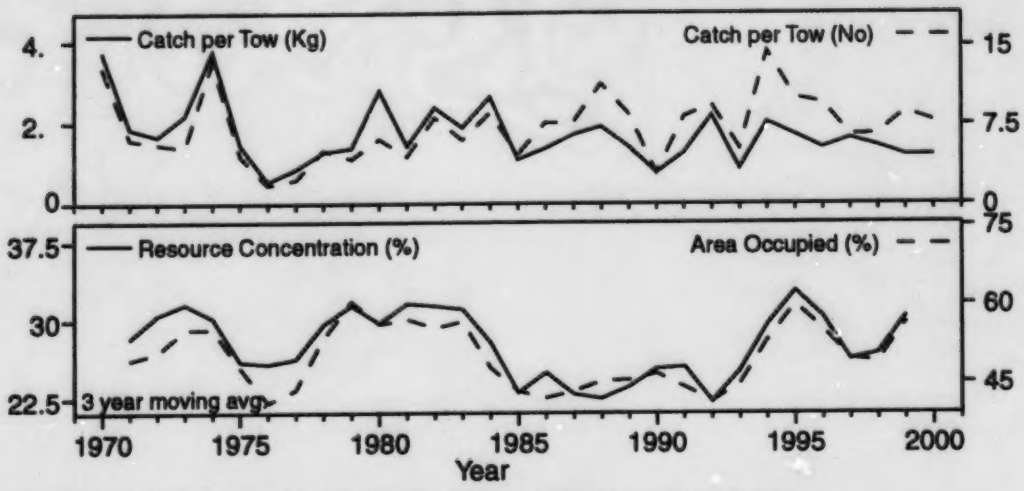

Fig. 49. 4X American Plaice stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

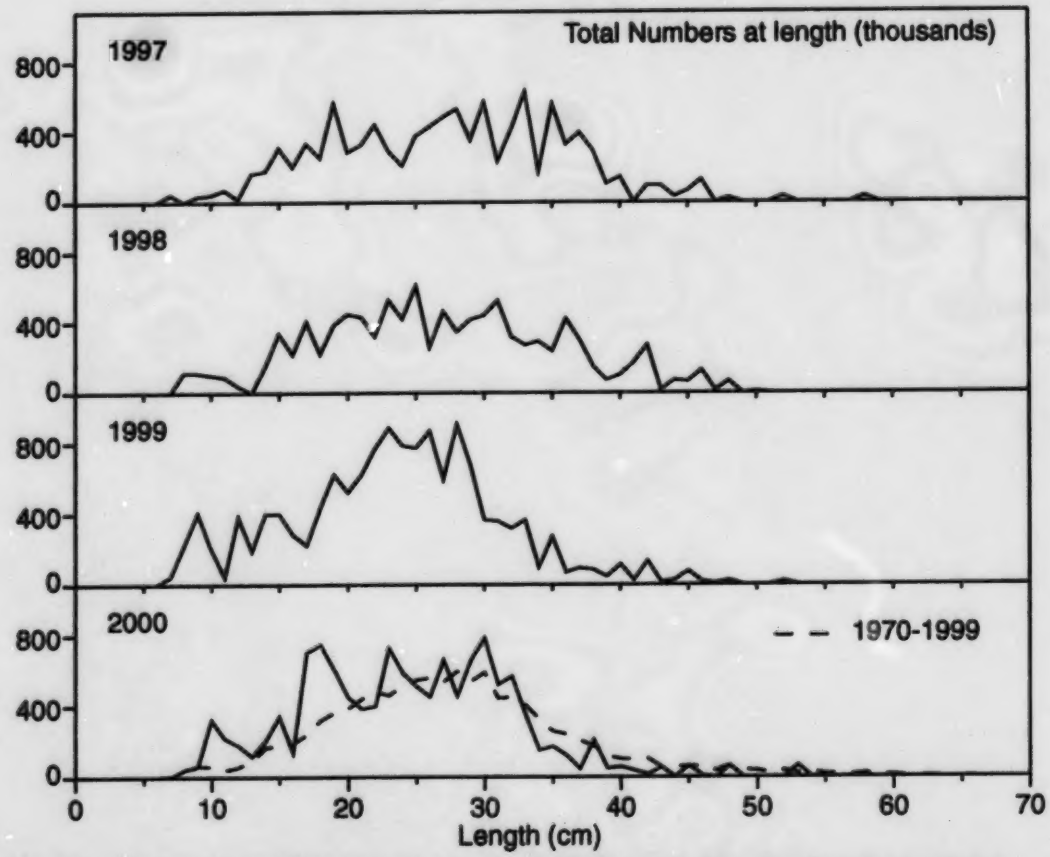

Fig. 50. 4X American Plaice length frequency distribution from the Summer surveys.

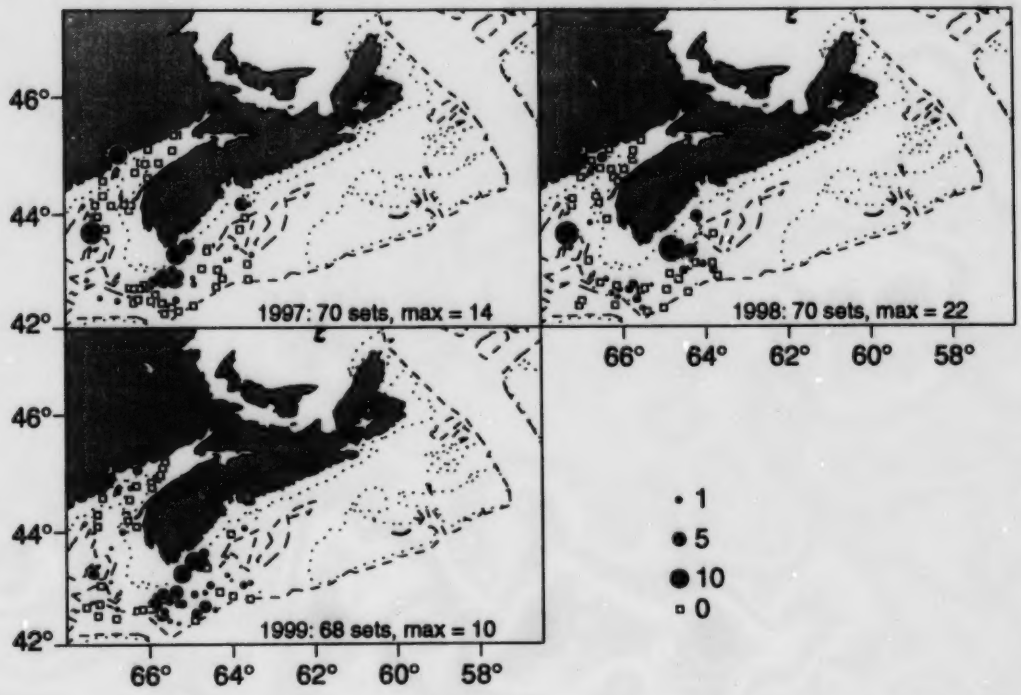

Fig. 51. 4X American Plaice Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

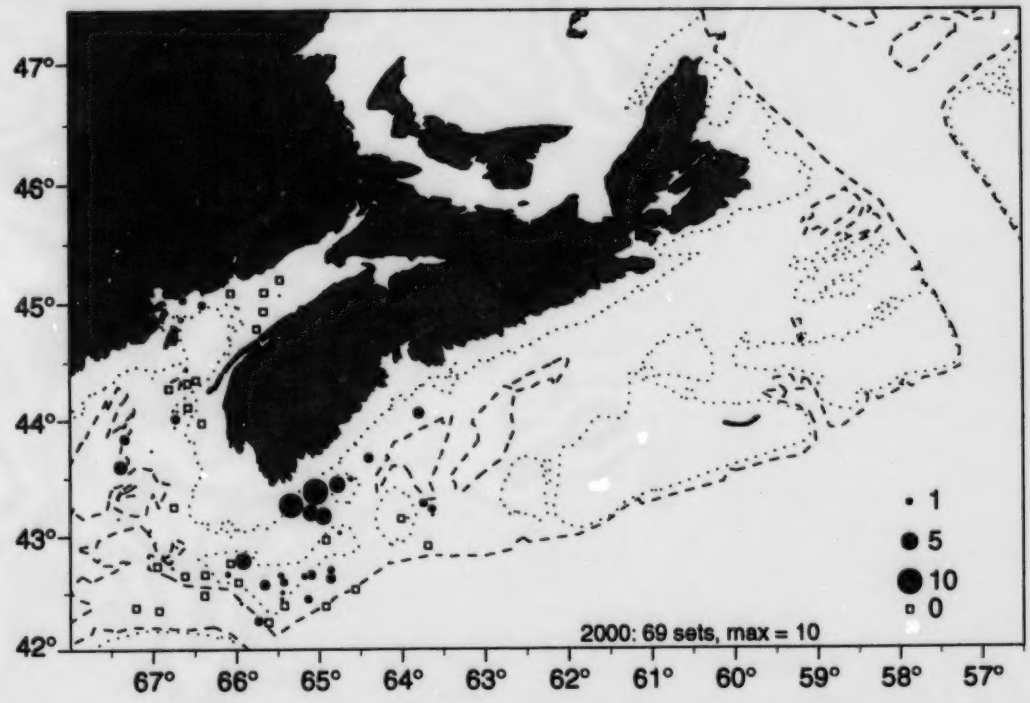

Fig. 52. 4X American Plaice Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

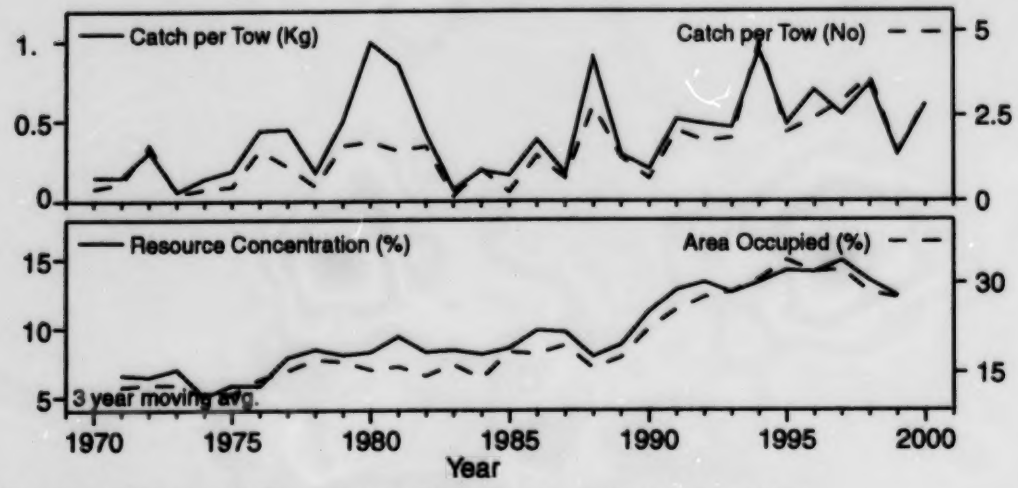

Fig. 53. 4X Yellowtail Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

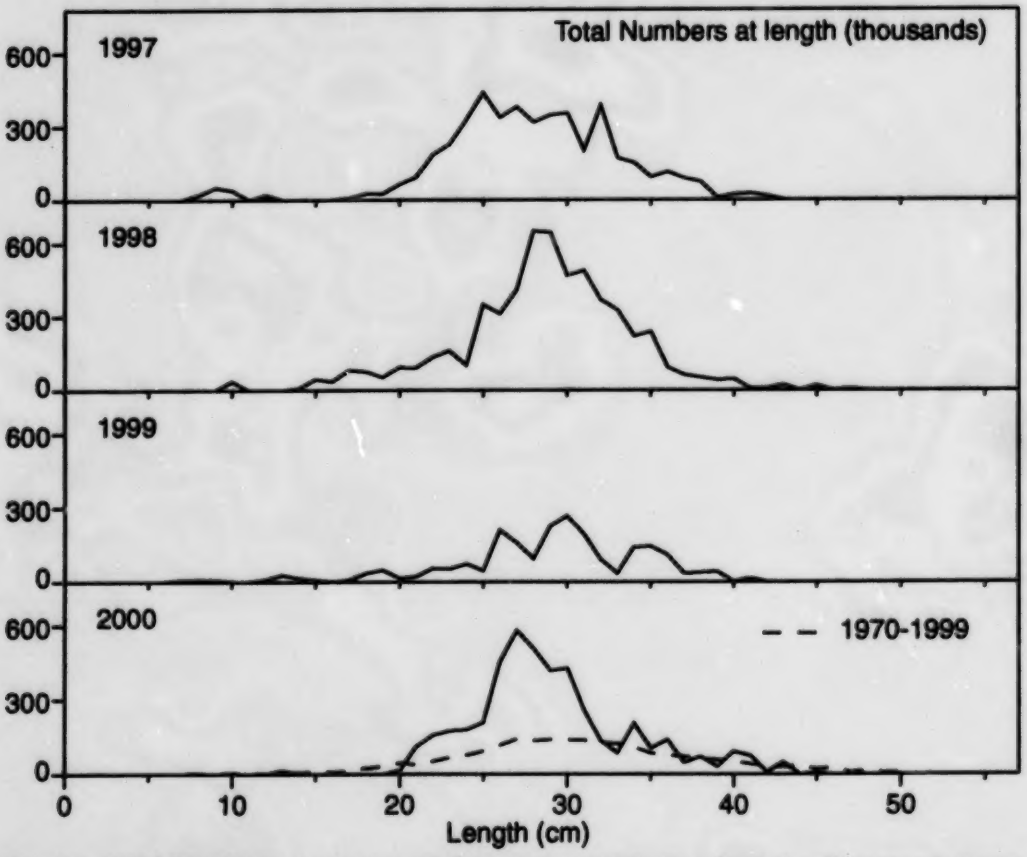

Fig. 54. 4X Yellowtail Flounder length frequency distribution from the Summer surveys.

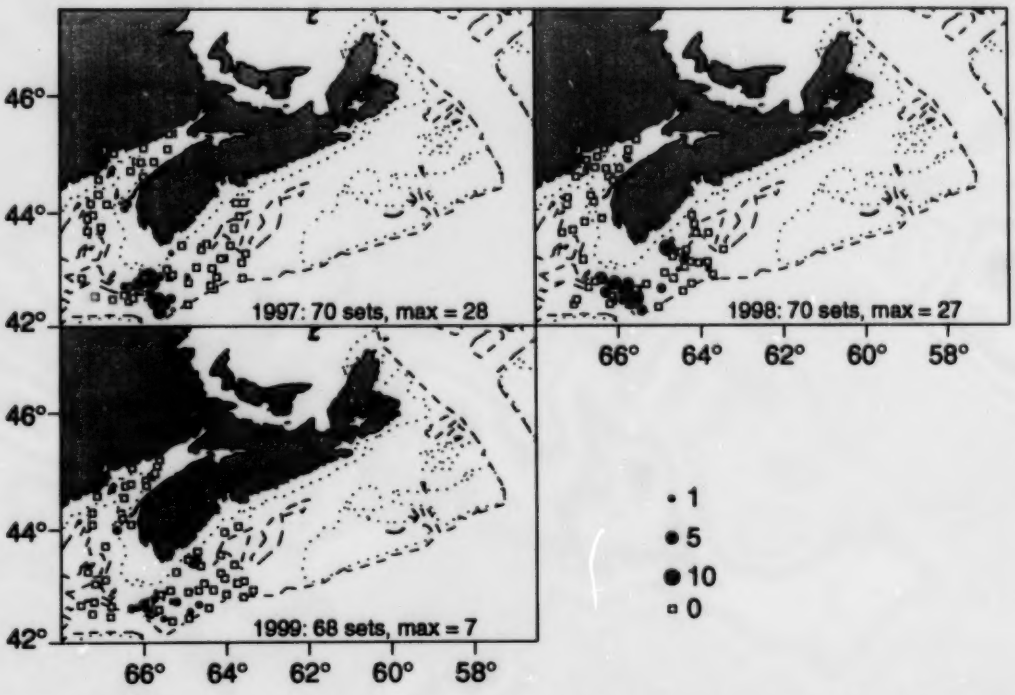

Fig. 55. 4X Yellowtail Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

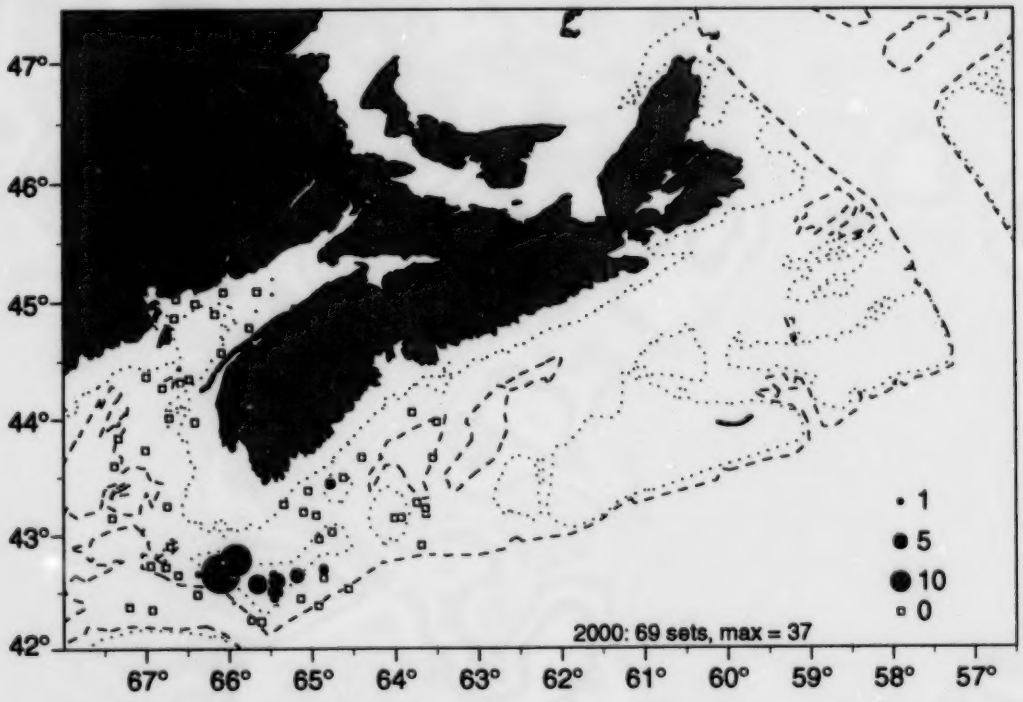

Fig. 56. 4X Yellowtail Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

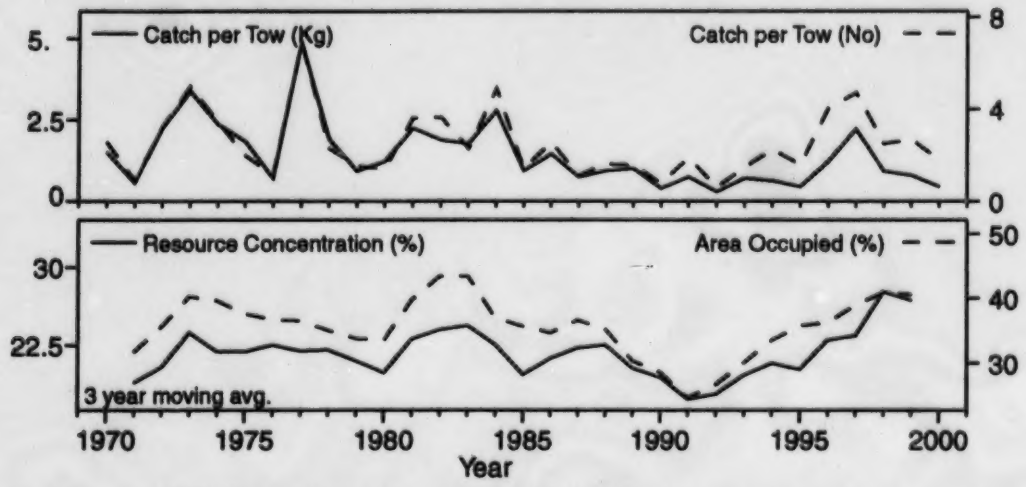

Fig. 57. 4X Witch Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

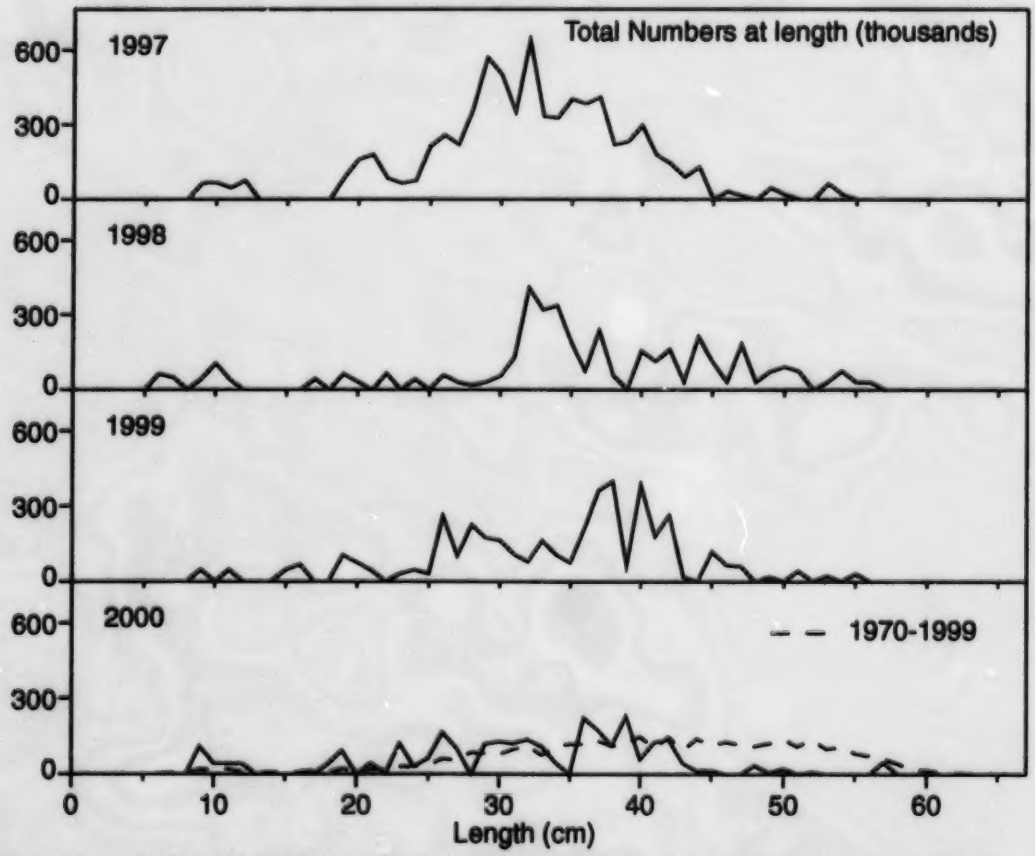

Fig. 58. 4X Witch Flounder length frequency distribution from the Summer surveys.

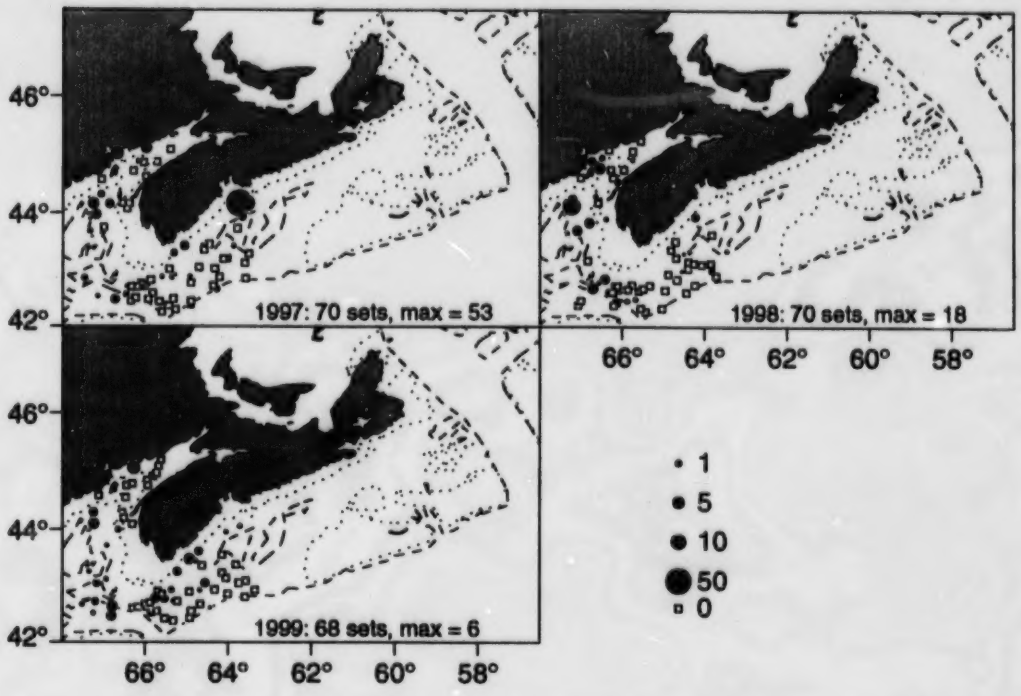

Fig. 59. 4X Witch Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

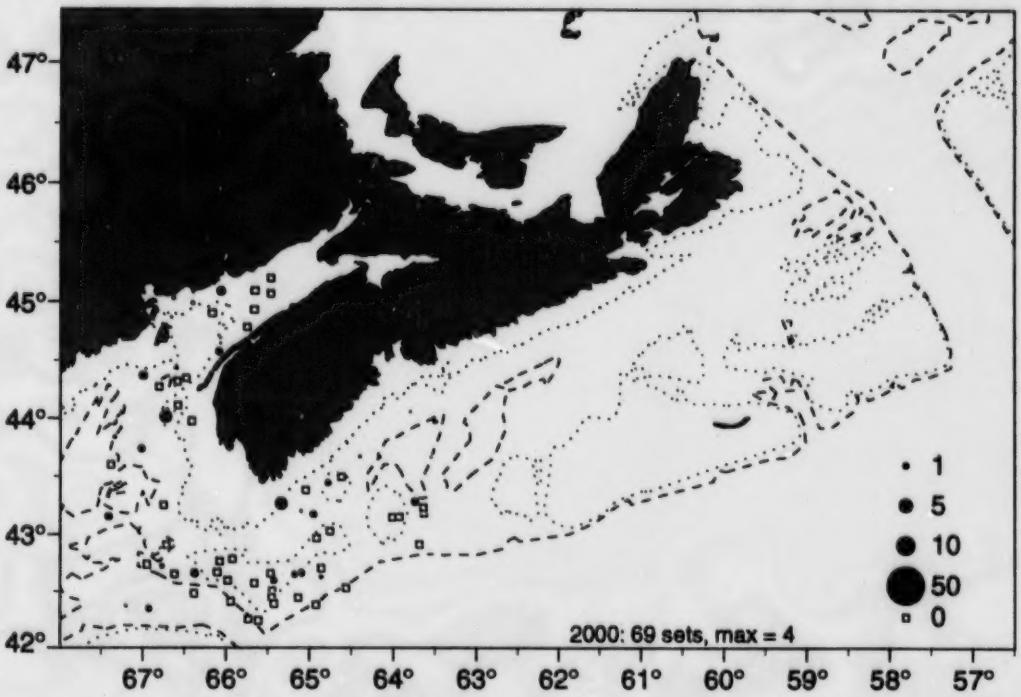

Fig. 60. 4X Witch Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

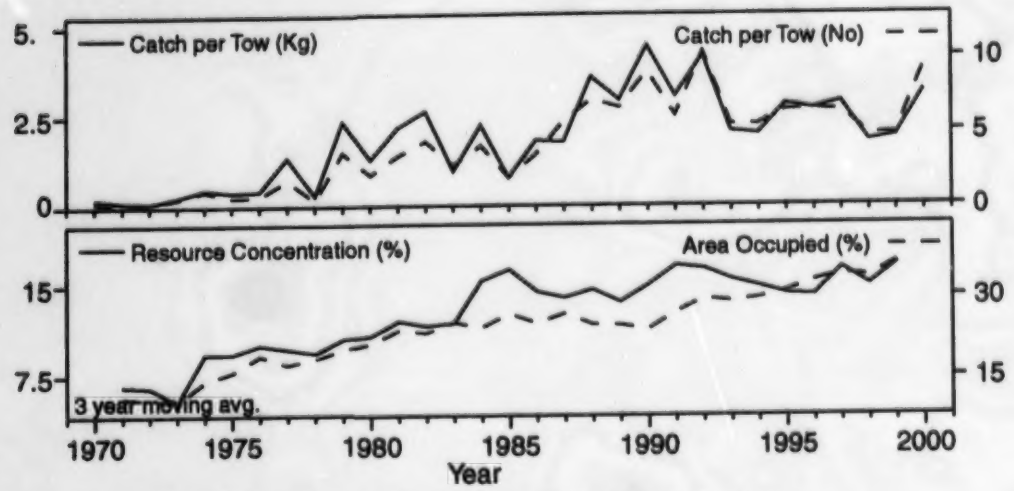

Fig. 61. 4X Winter Flounder stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

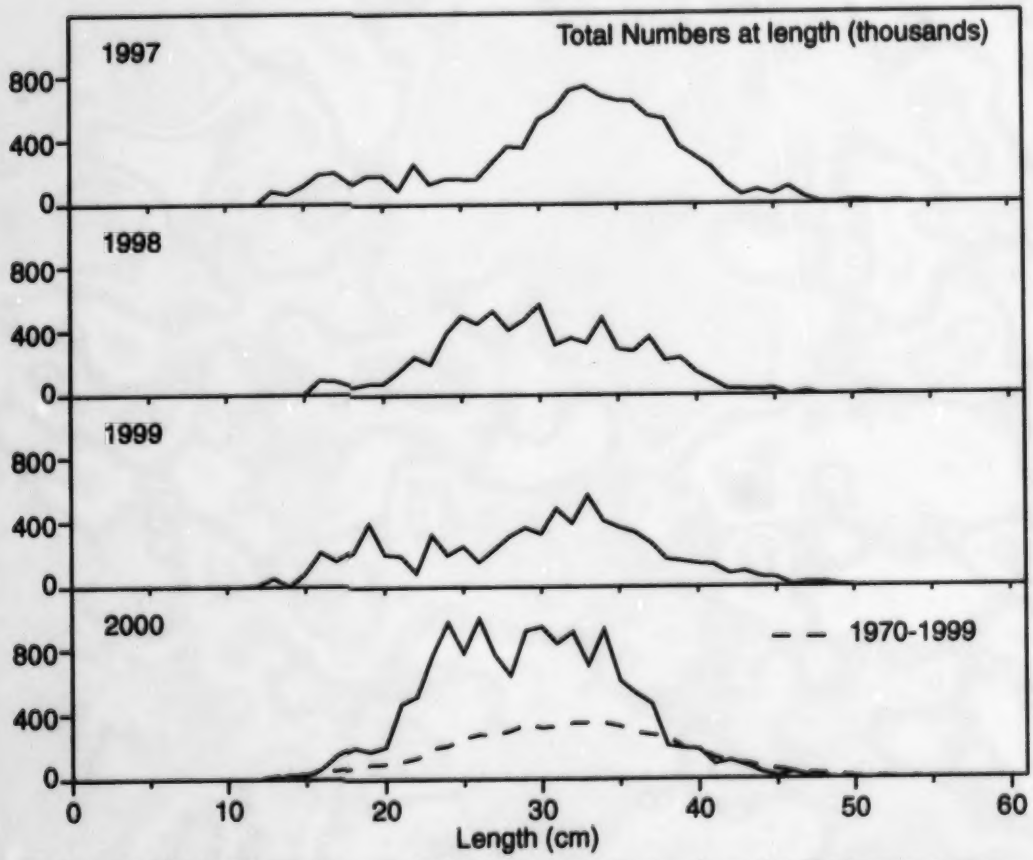

Fig. 62. 4X Winter Flounder length frequency distribution from the Summer surveys.

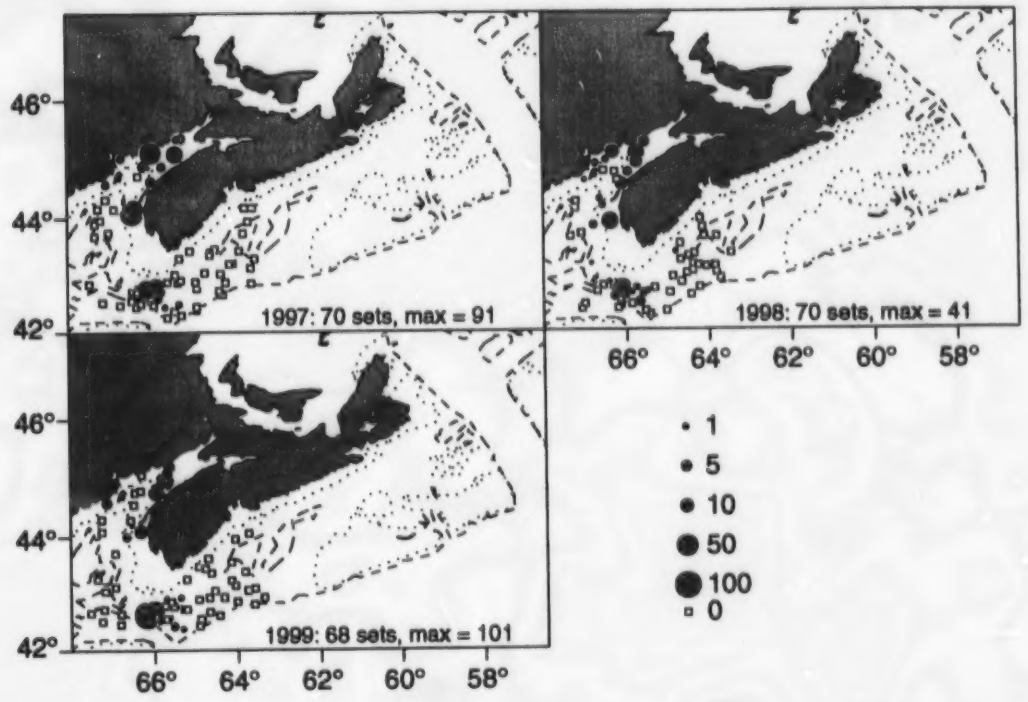

Fig. 63. 4X Winter Flounder Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

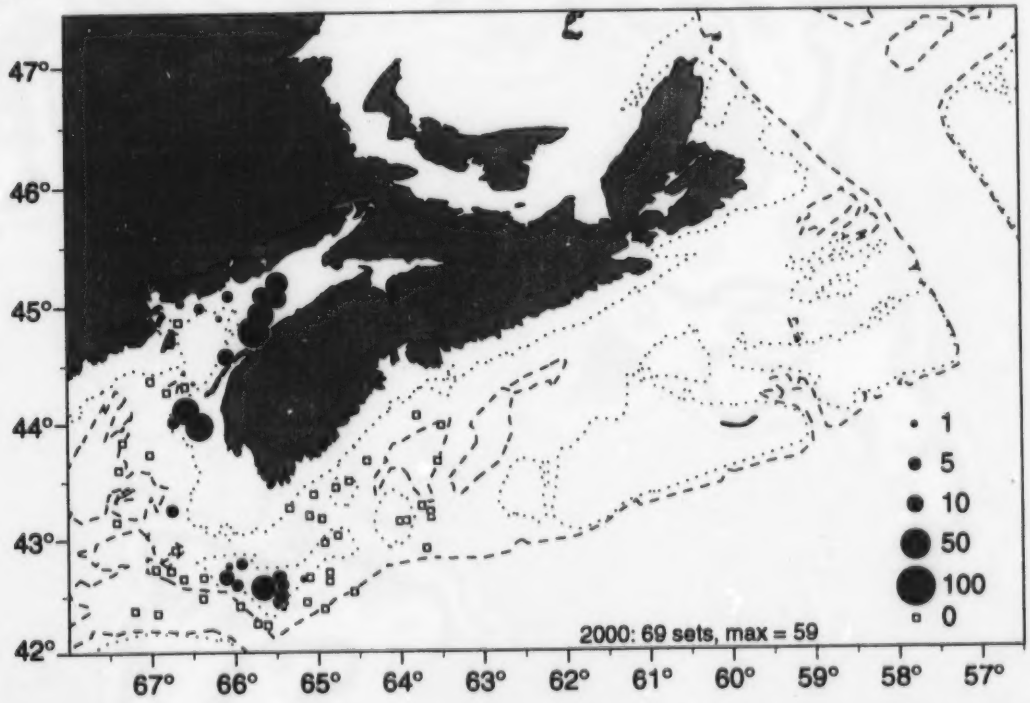

Fig. 64. 4X Winter Flounder Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

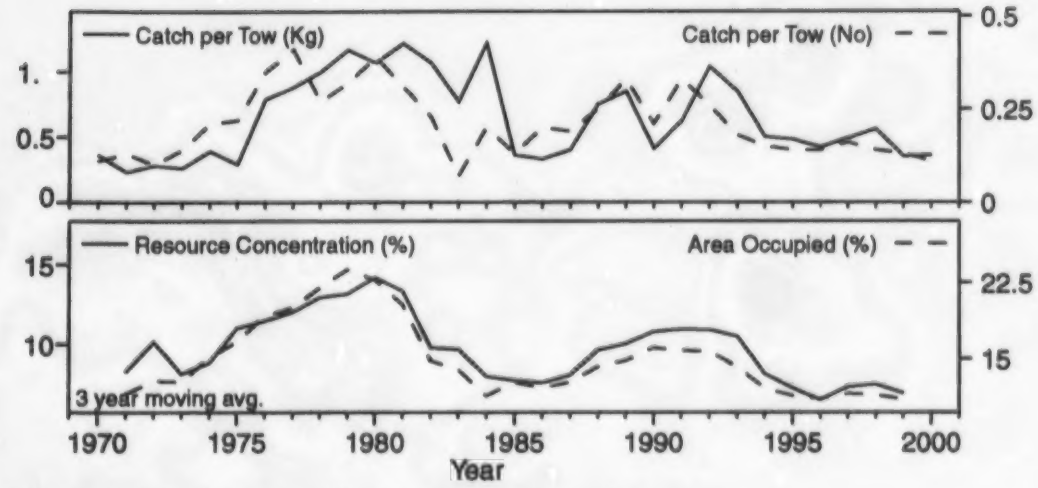

Fig. 65. 4VWX Halibut stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

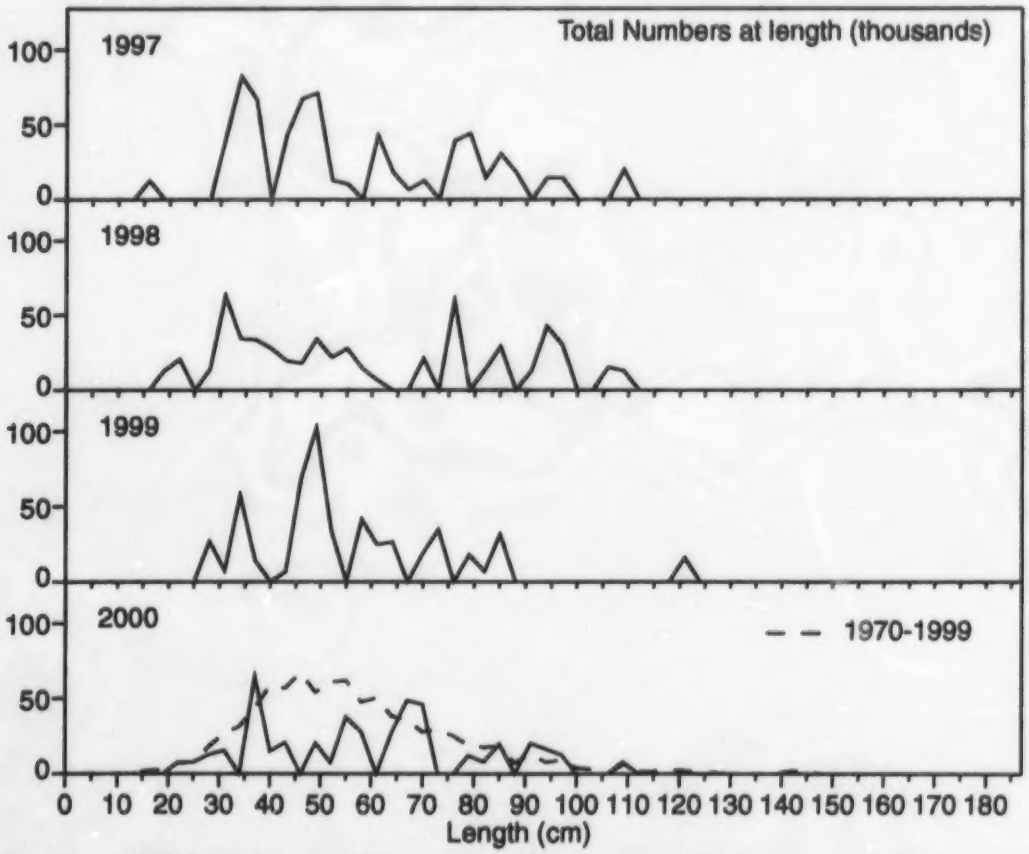

Fig. 66. 4VWX Halibut length frequency distribution from the Summer surveys.

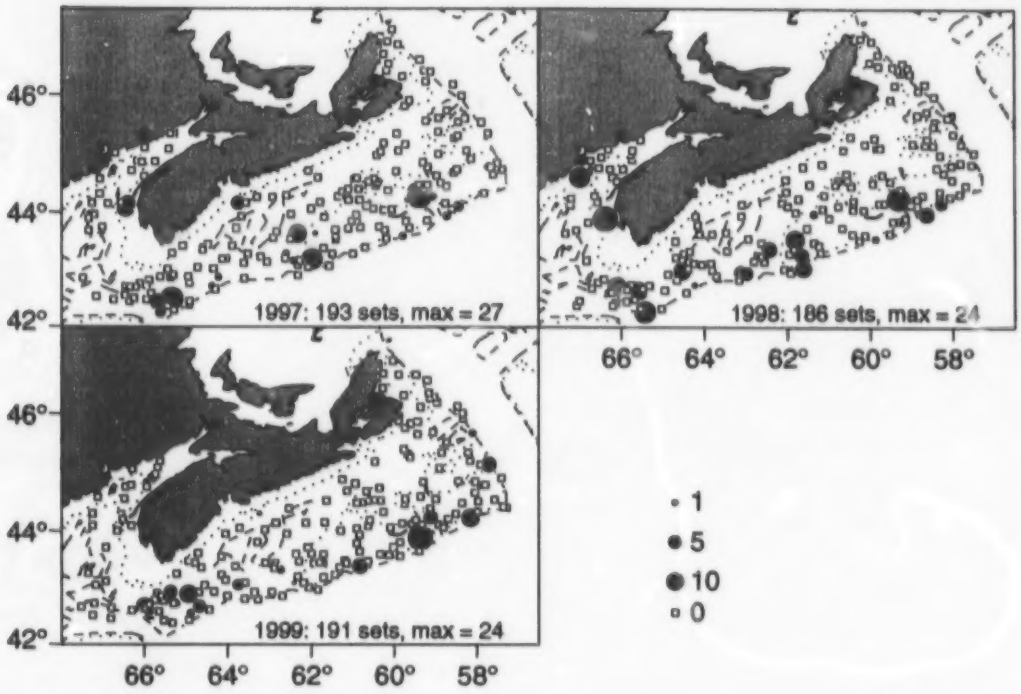

Fig. 67. 4VWX Halibut Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

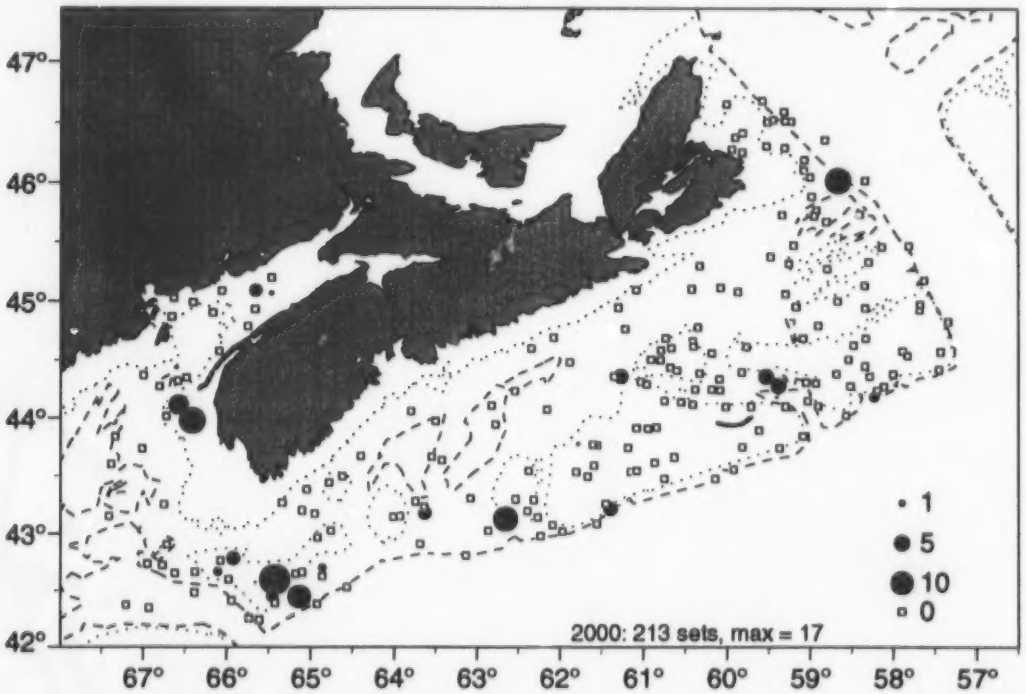

Fig. 68. 4VWX Halibut Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

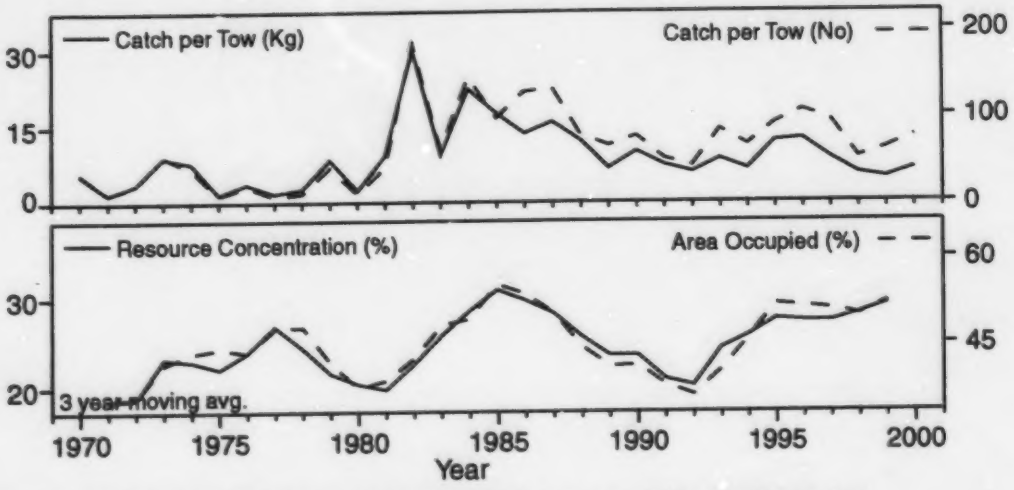

Fig. 69. 4VWX-484/495 Silver Hake stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

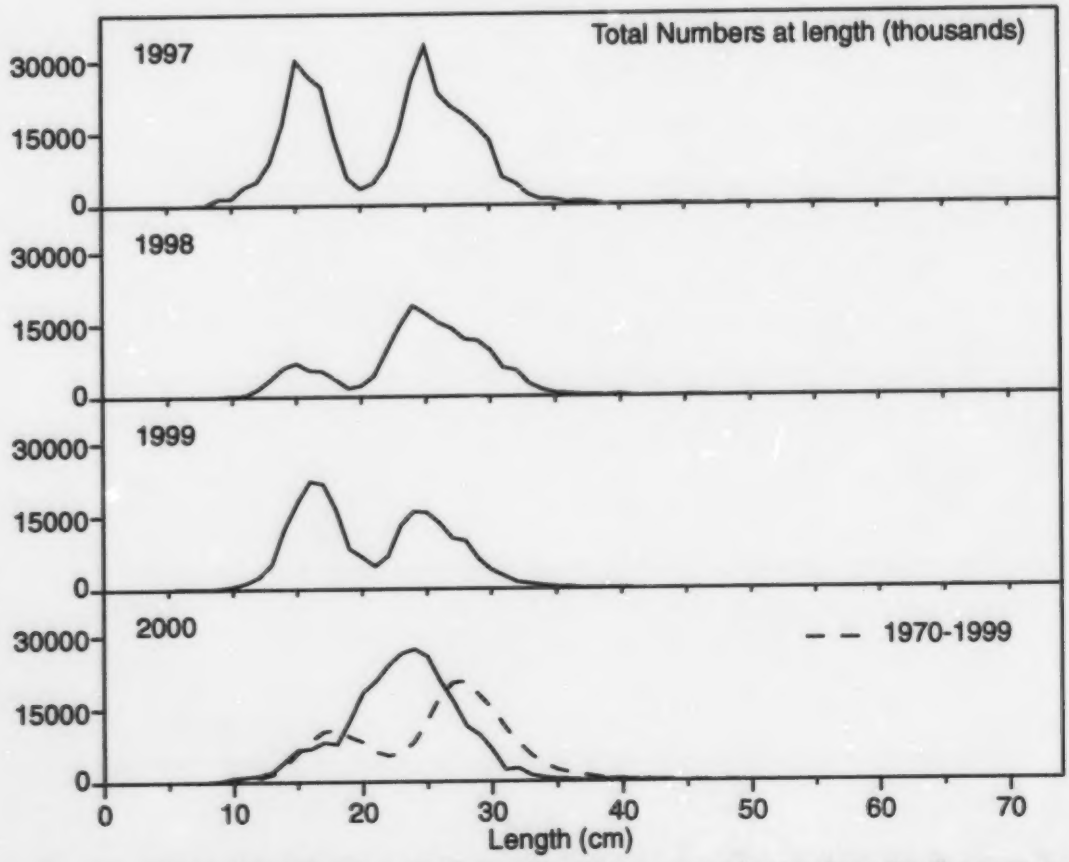

Fig. 70. 4VWX-484/495 Silver Hake length frequency distribution from the Summer surveys.

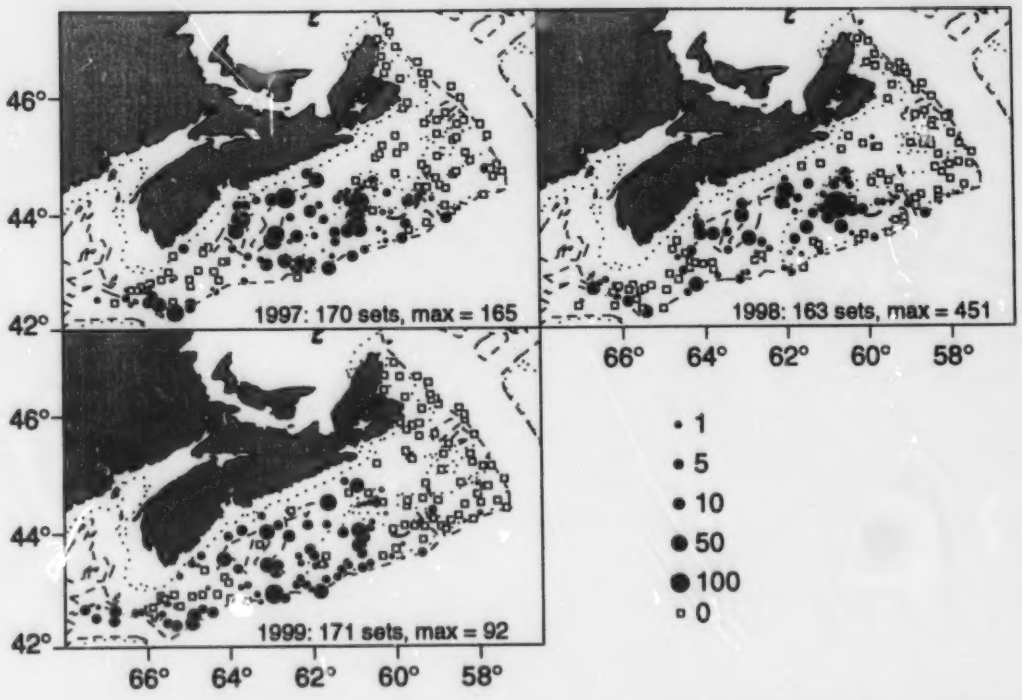

Fig. 71. 4VWX-484/495 Silver Hake Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

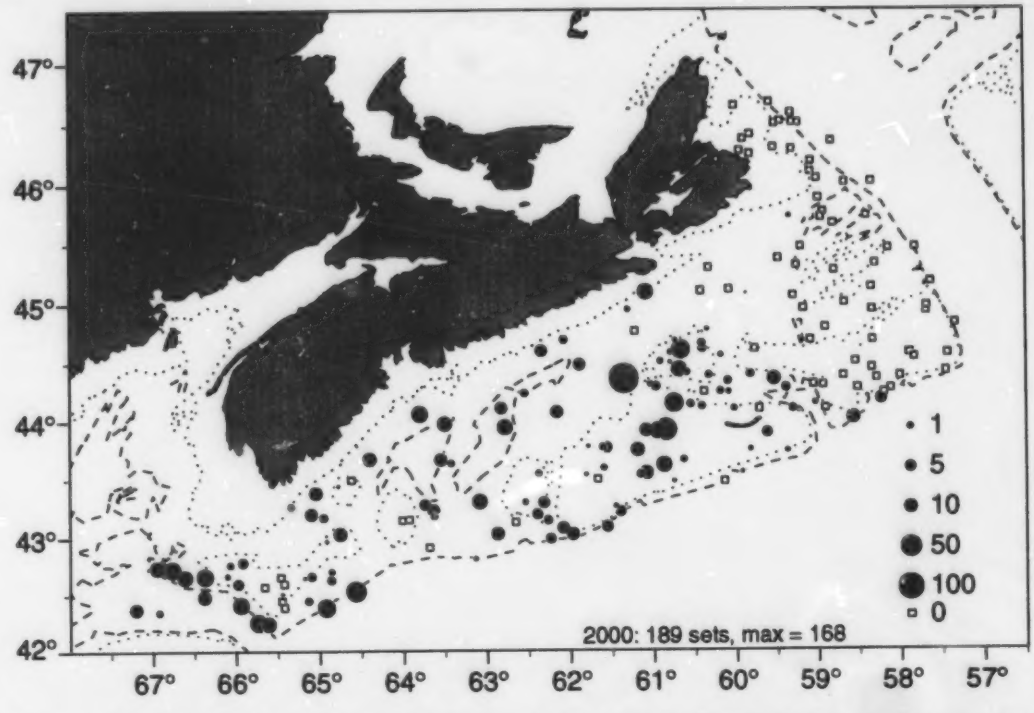

Fig. 72. 4VWX-484/495 Silver Hake Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

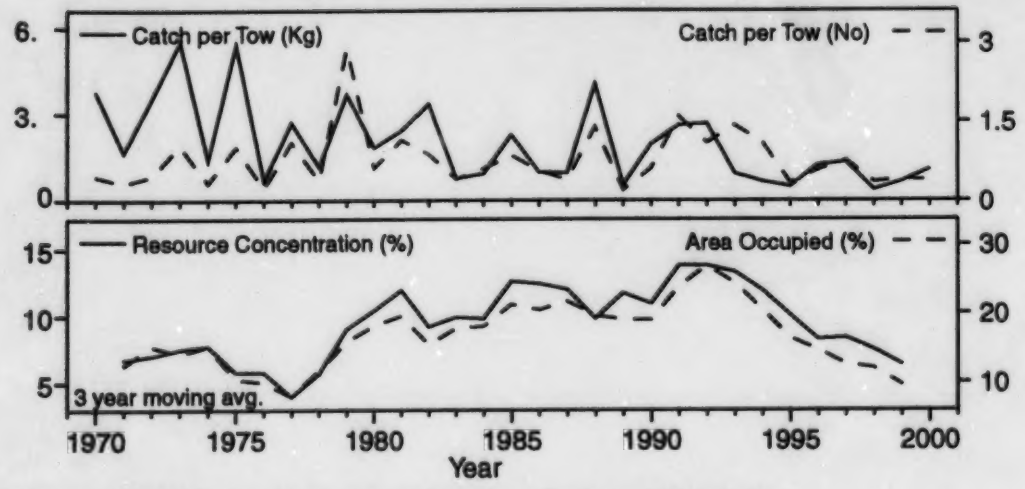

Fig. 73. 4VsW Winter Skate stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

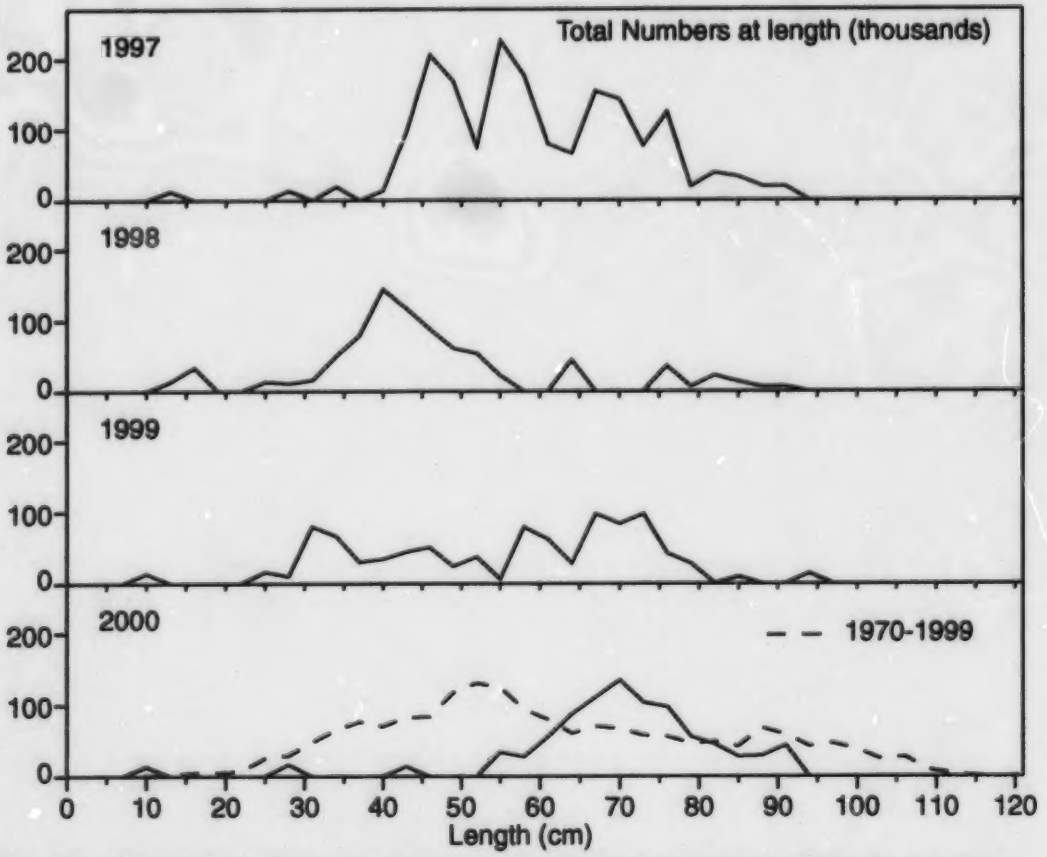

Fig. 74. 4VsW Winter Skate length frequency distribution from the Summer surveys.

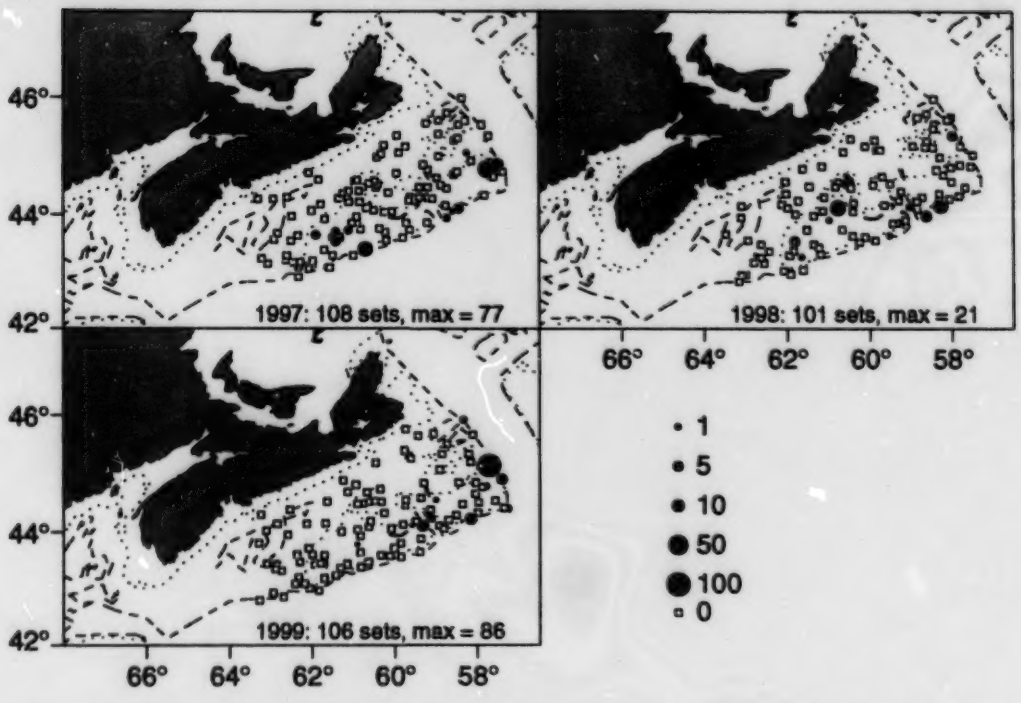

Fig. 75. 4VsW Winter Skate Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

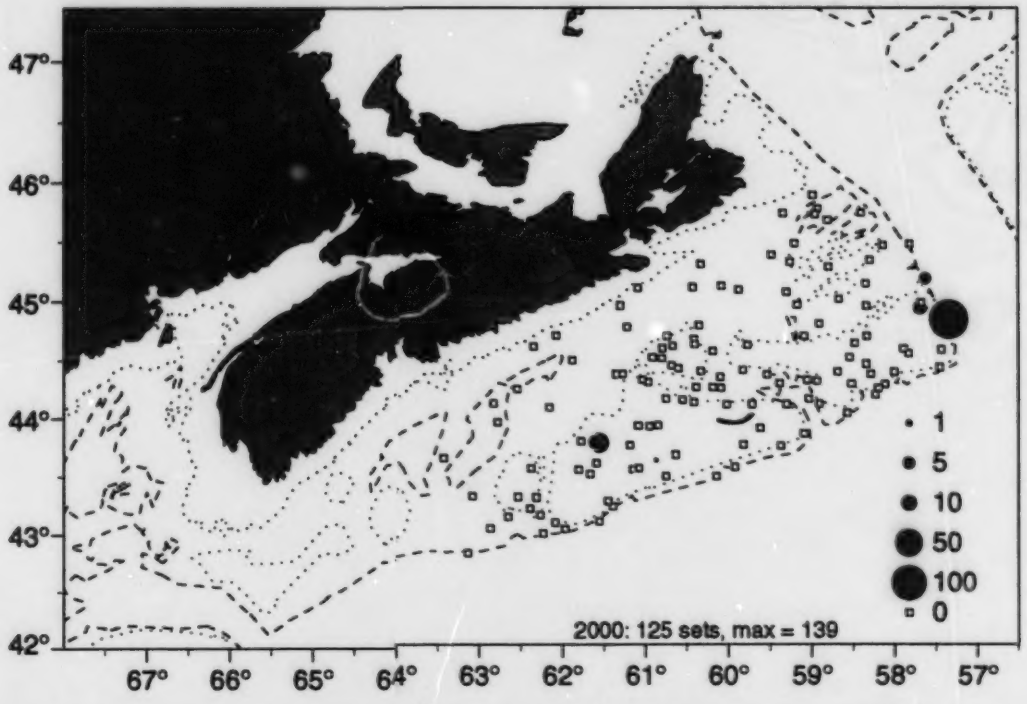

Fig. 76. 4VsW Winter Skate Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

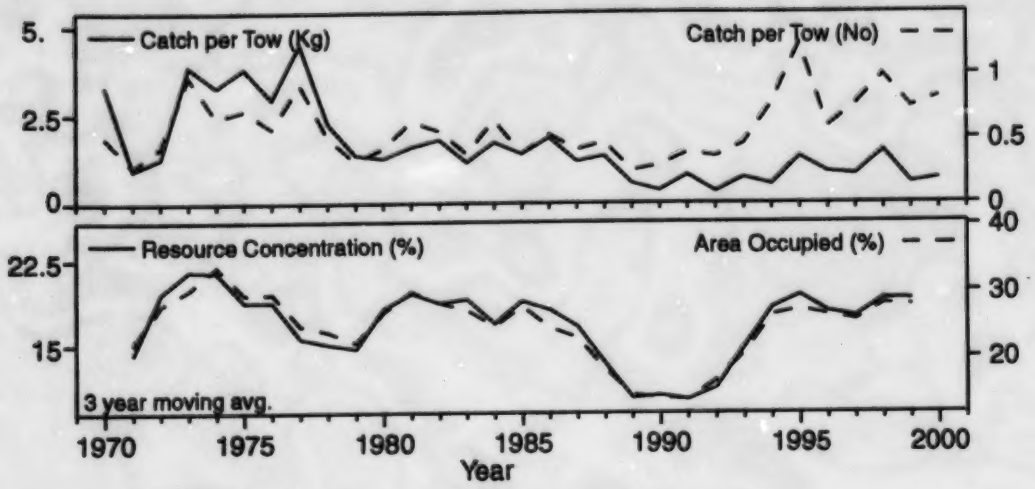

Fig. 77. 4VWX Monkfish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

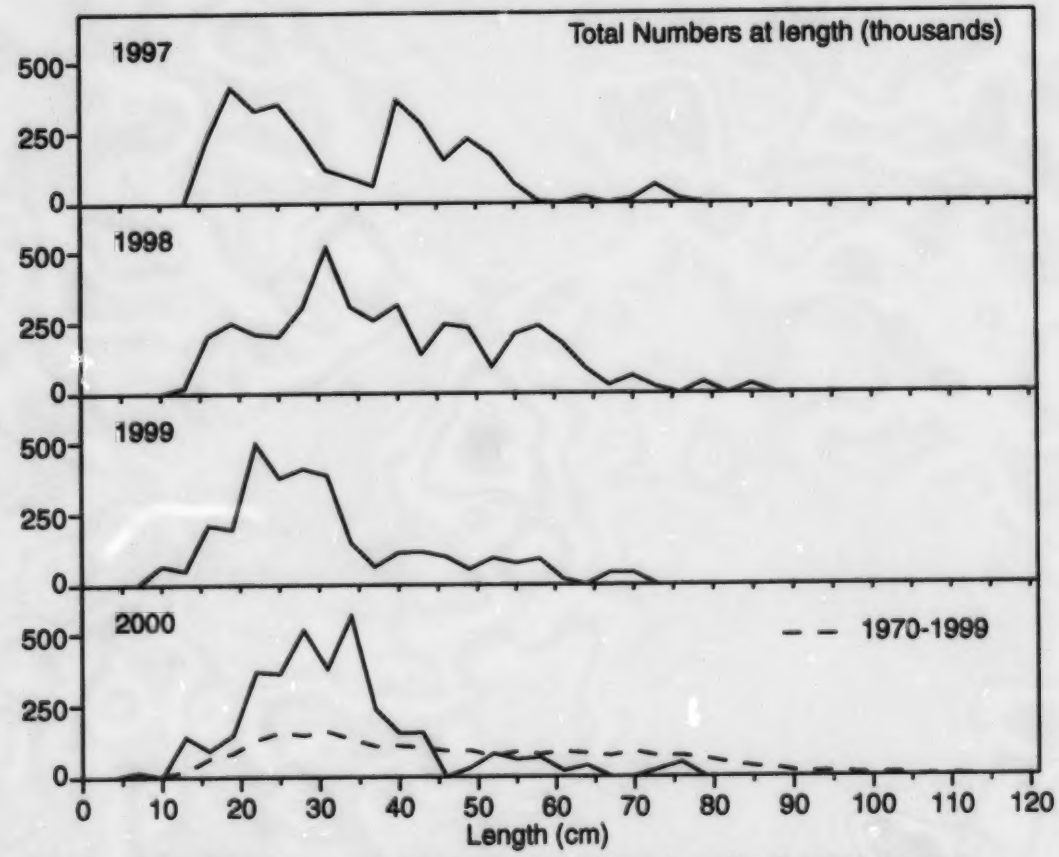

Fig. 78. 4VWX Monkfish length frequency distribution from the Summer surveys.

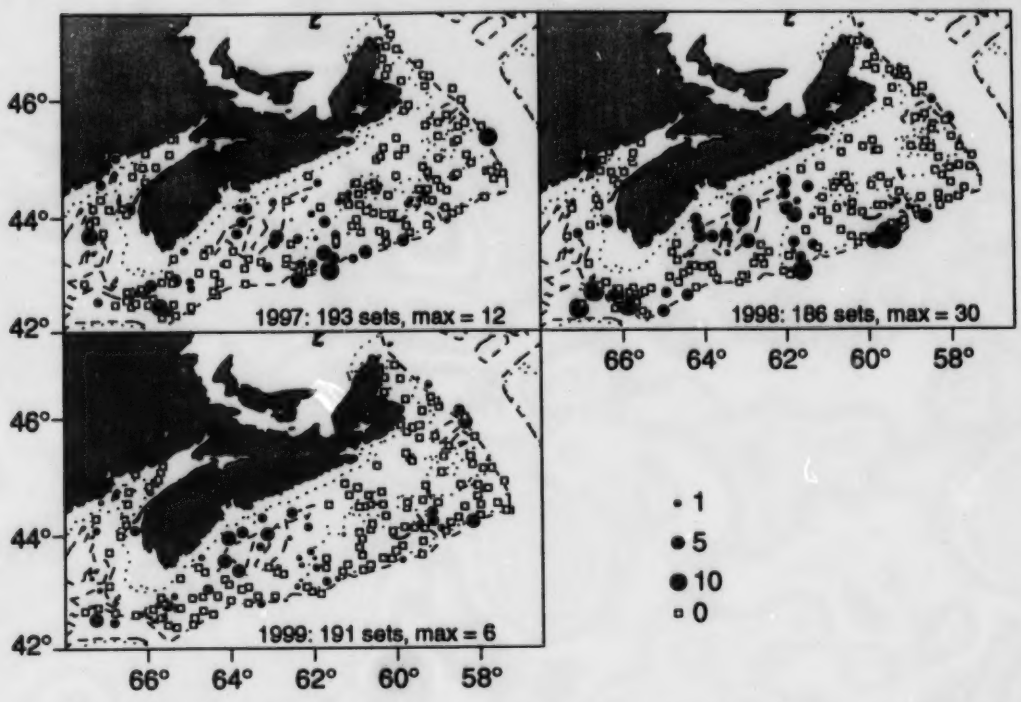

Fig. 79. 4VWX Monkfish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

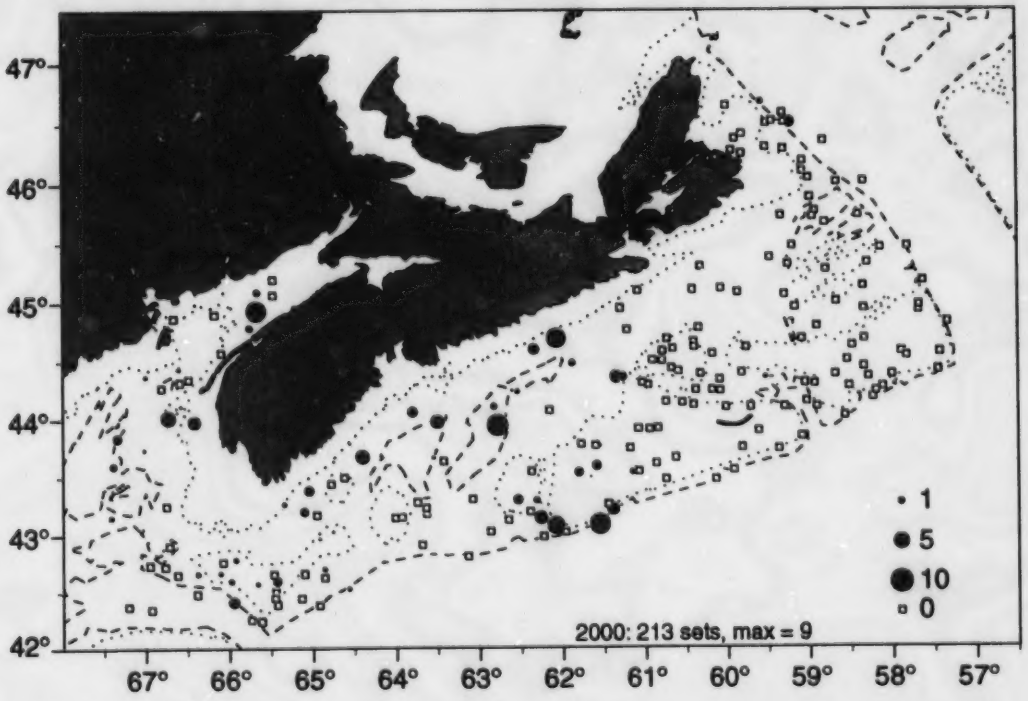

Fig. 80. 4VWX Monkfish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

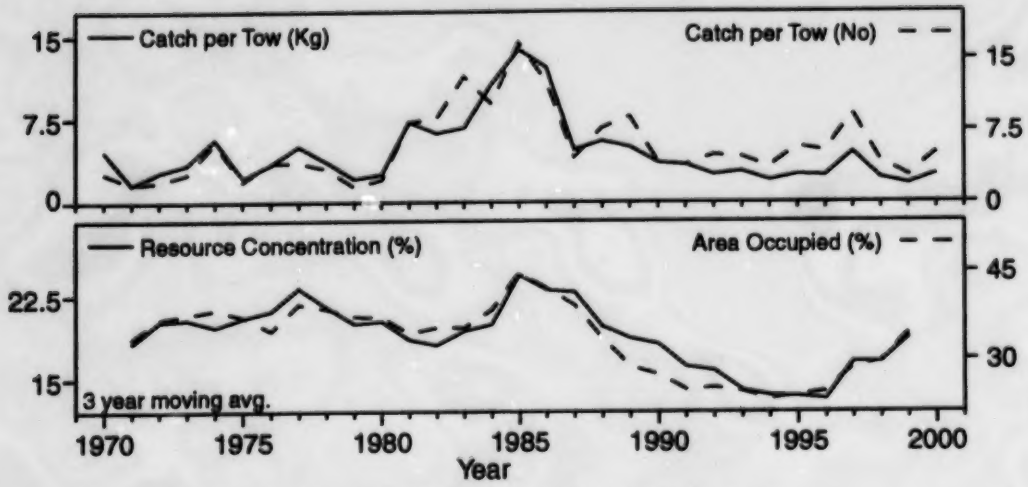

Fig. 81. 4VW White Hake stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

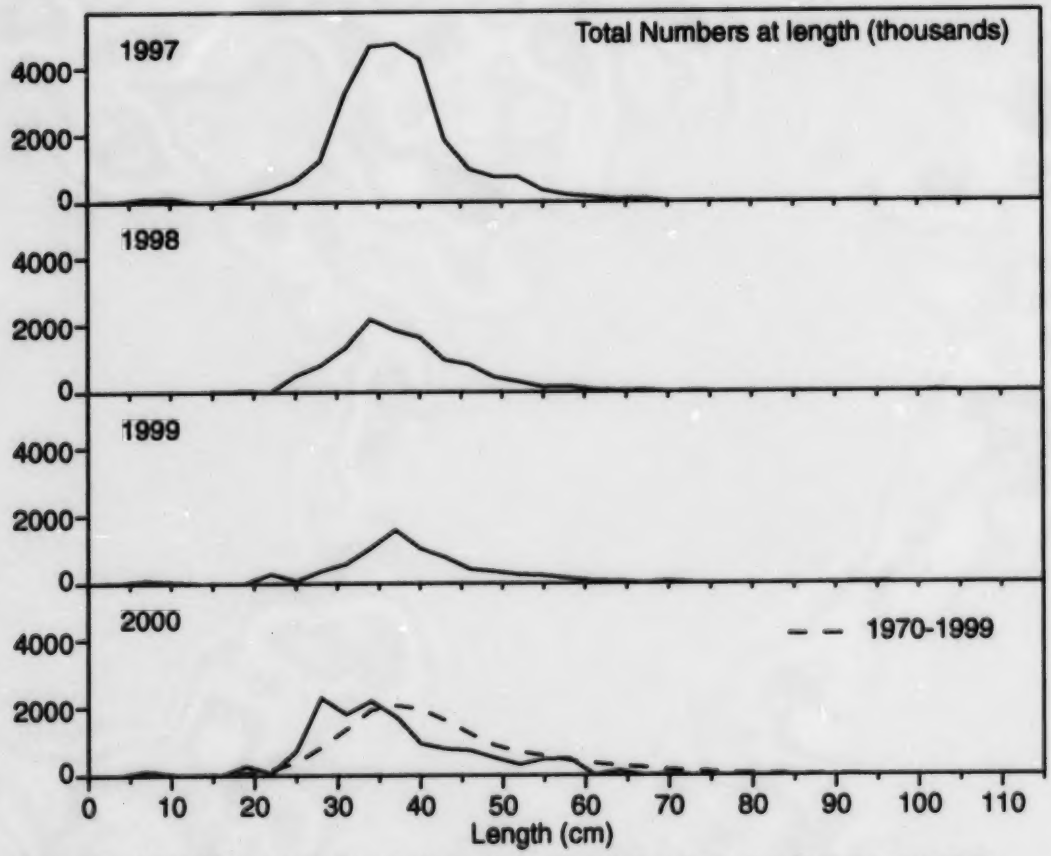

Fig. 82. 4VW White Hake length frequency distribution from the Summer surveys.

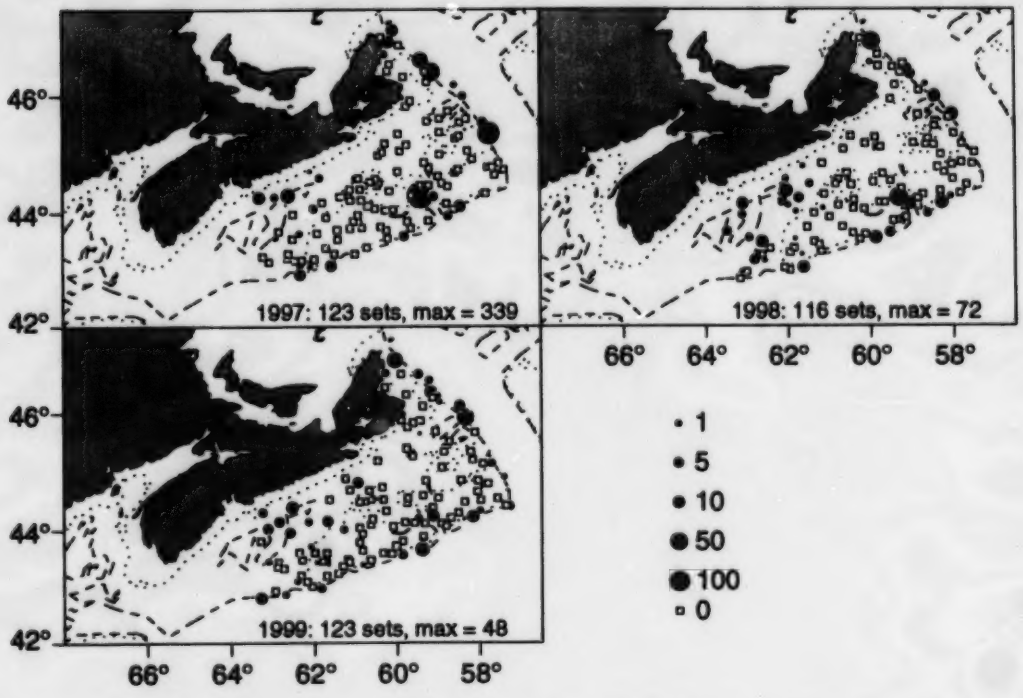

Fig. 83. 4VW White Hake Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

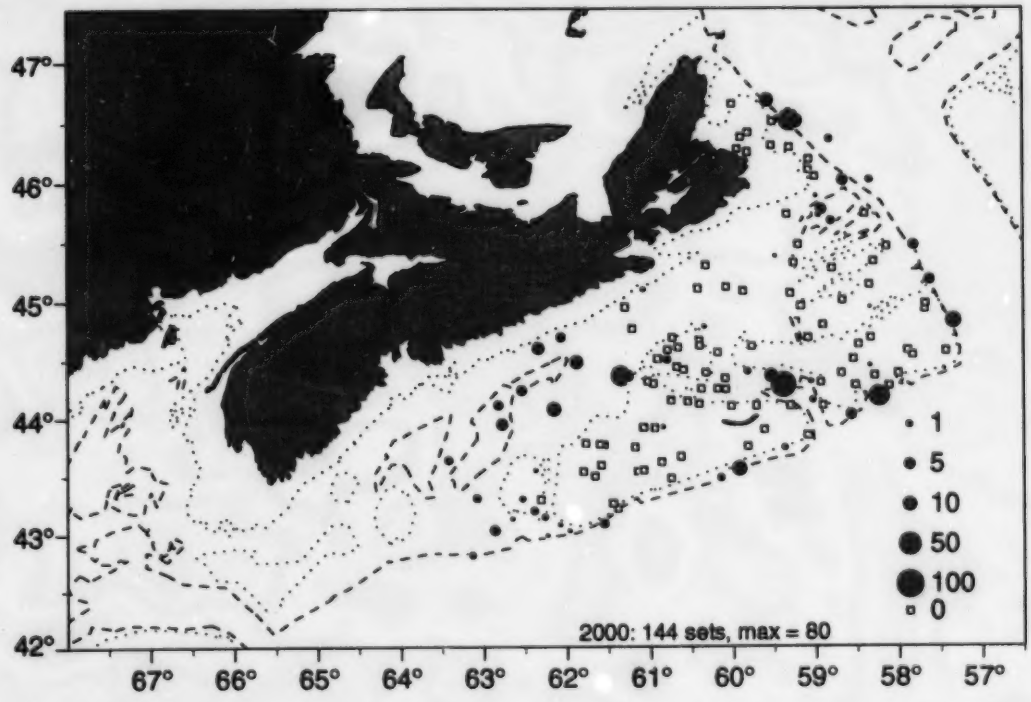

Fig. 84. 4VW White Hake Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

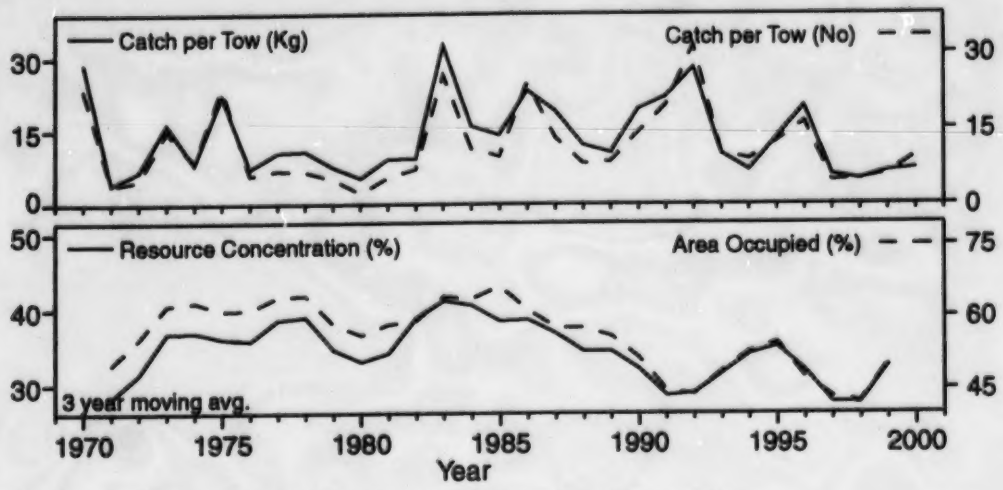

Fig. 85. 4X White Hake stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

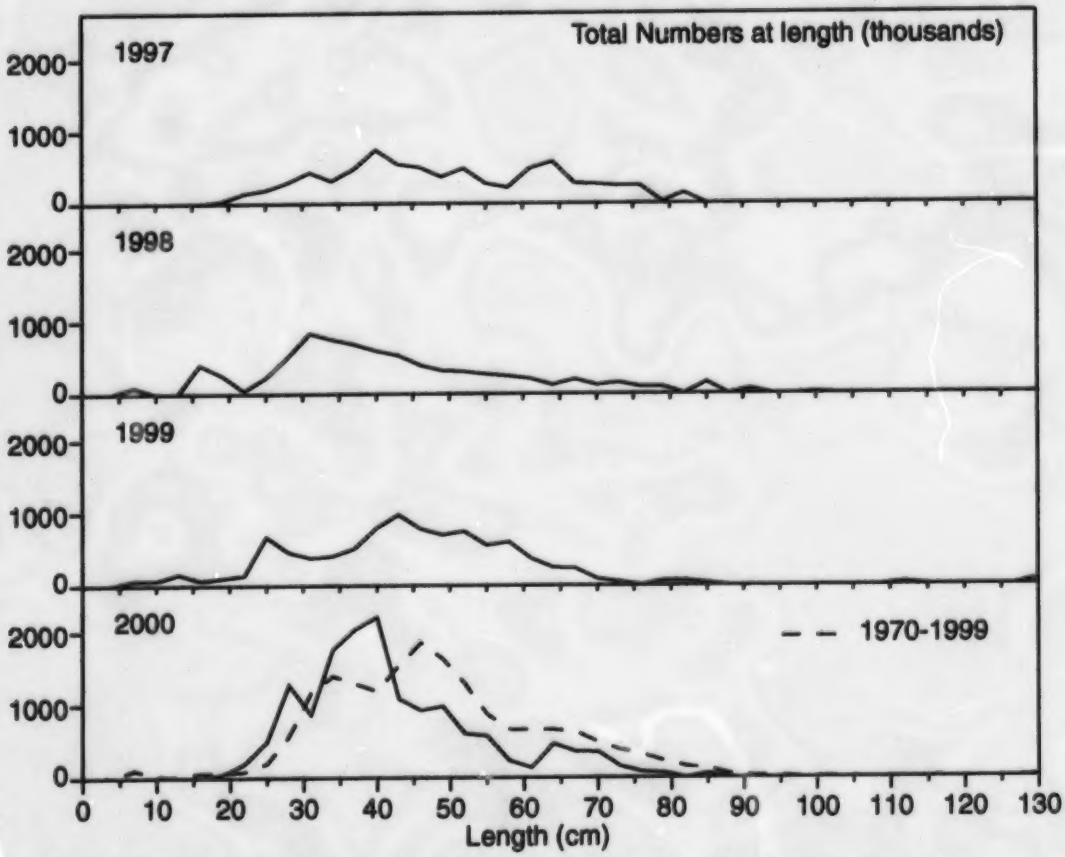

Fig. 86. 4X White Hake length frequency distribution from the Summer surveys.

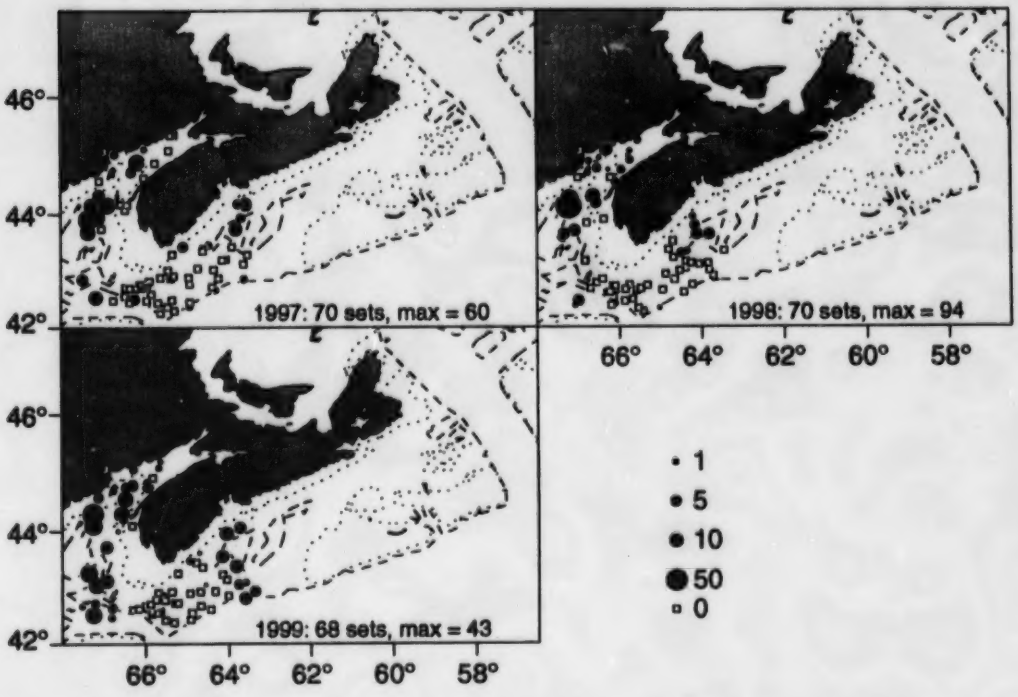

Fig. 87. 4X White Hake Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

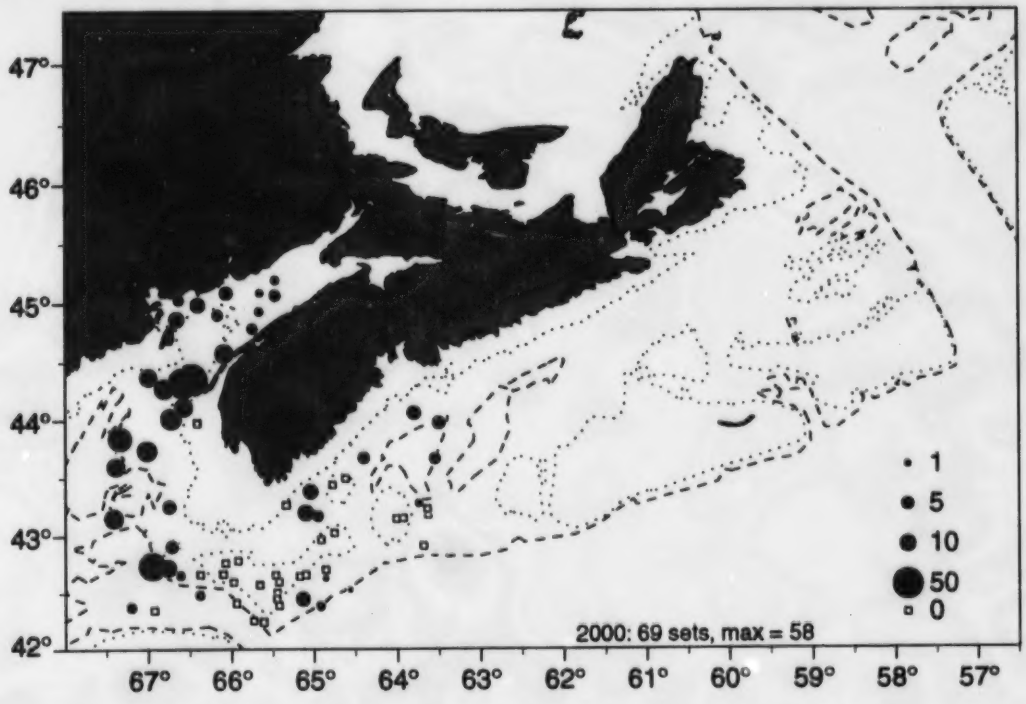

Fig. 88. 4X White Hake Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

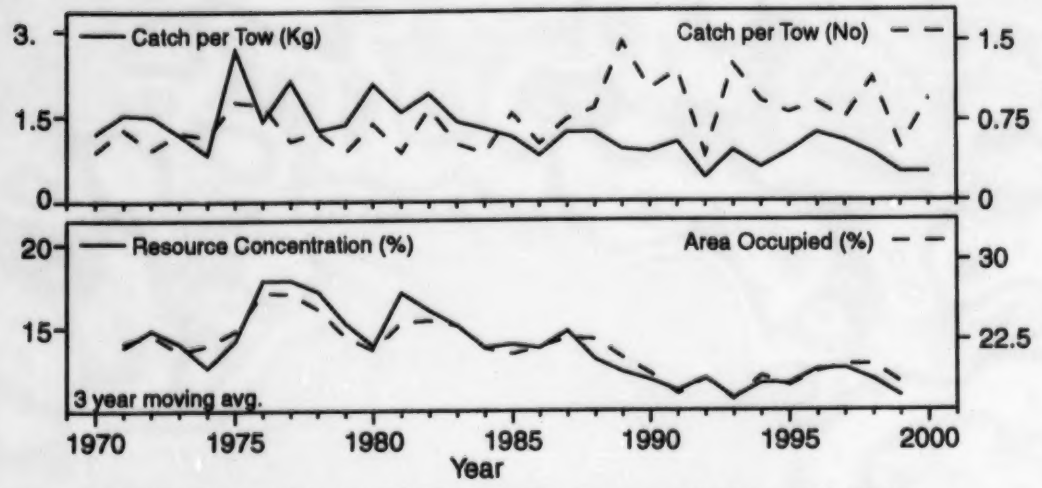

Fig. 89. 4VWX Striped Atlantic Wolffish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

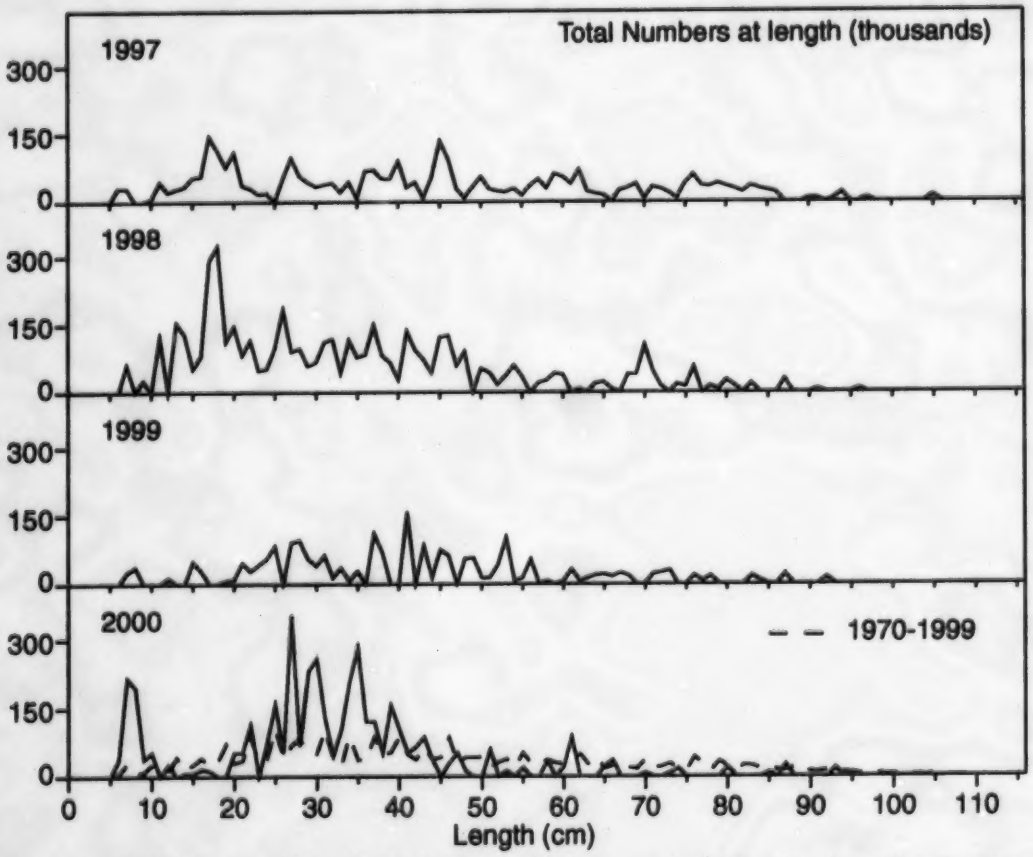

Fig. 90. 4VWX Striped Atlantic Wolffish length frequency distribution from the Summer surveys.

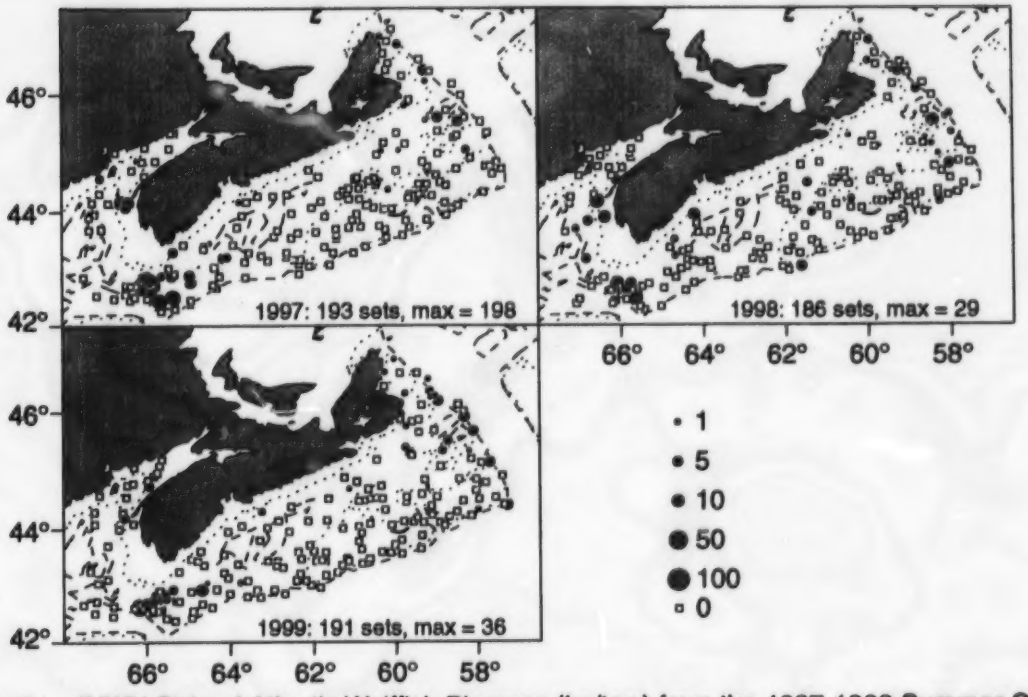

Fig. 91. 4VWX Striped Atlantic Wolffish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

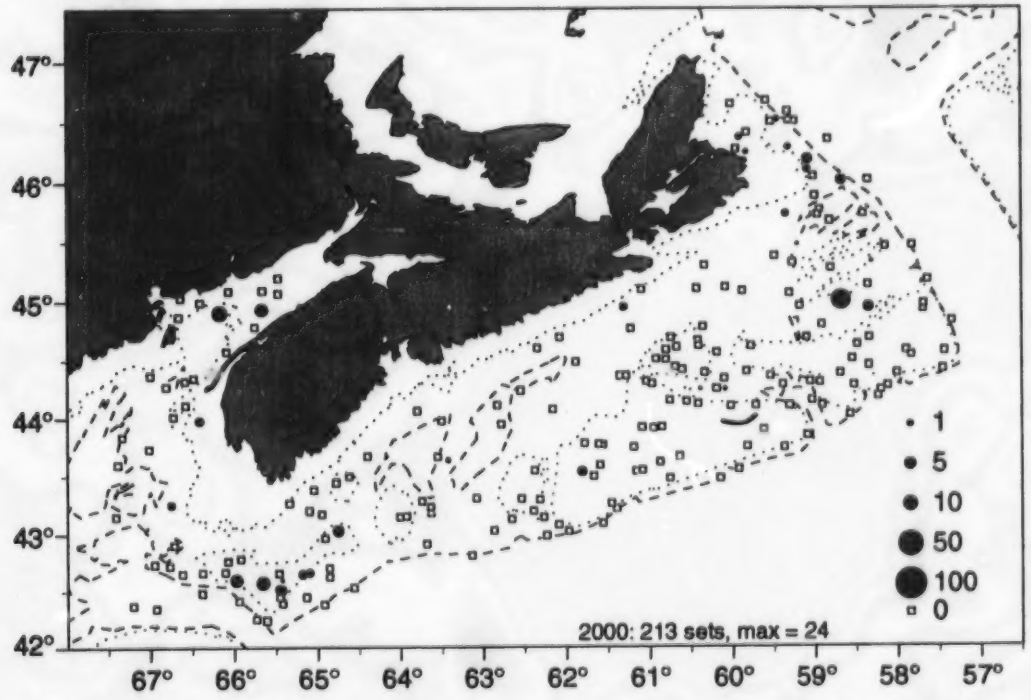

Fig. 92. 4VWX Striped Atlantic Wolffish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

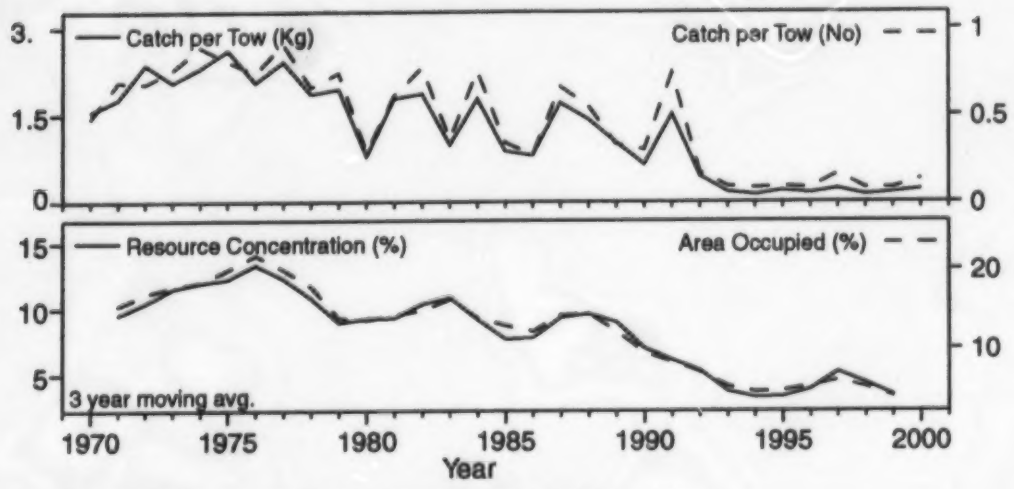

Fig. 93. 4VWX Cusk stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

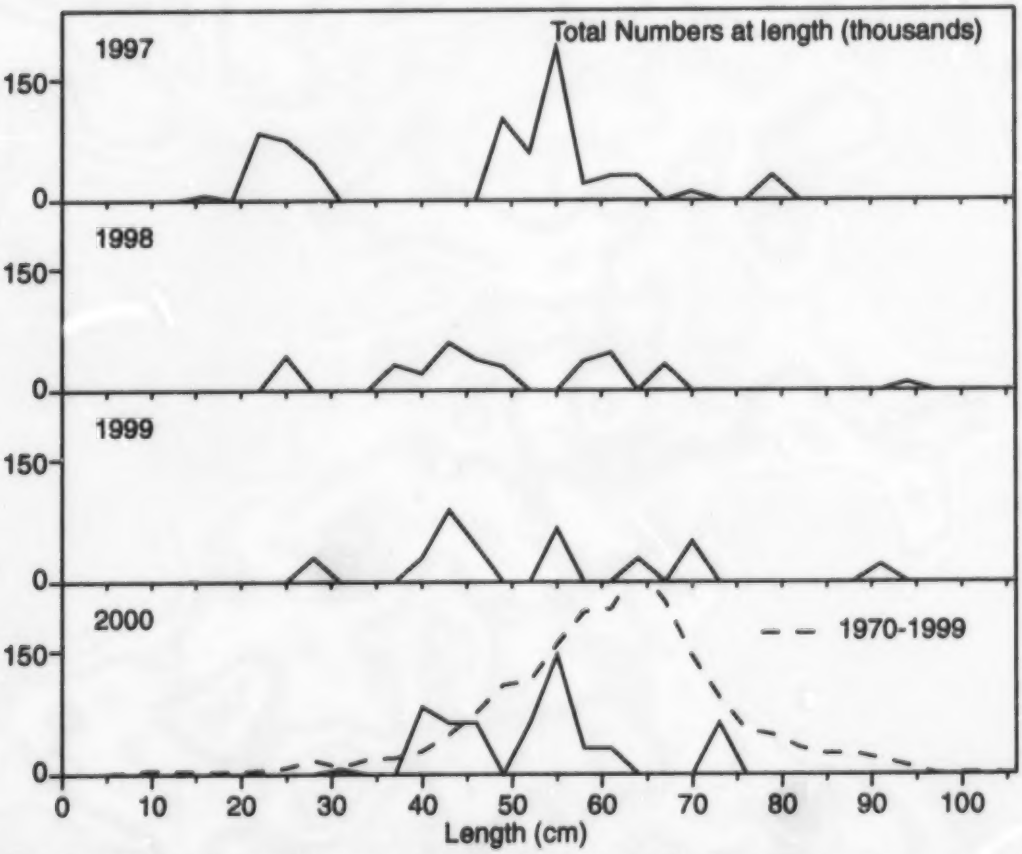

Fig. 94. 4VWX Cusk length frequency distribution from the Summer surveys.

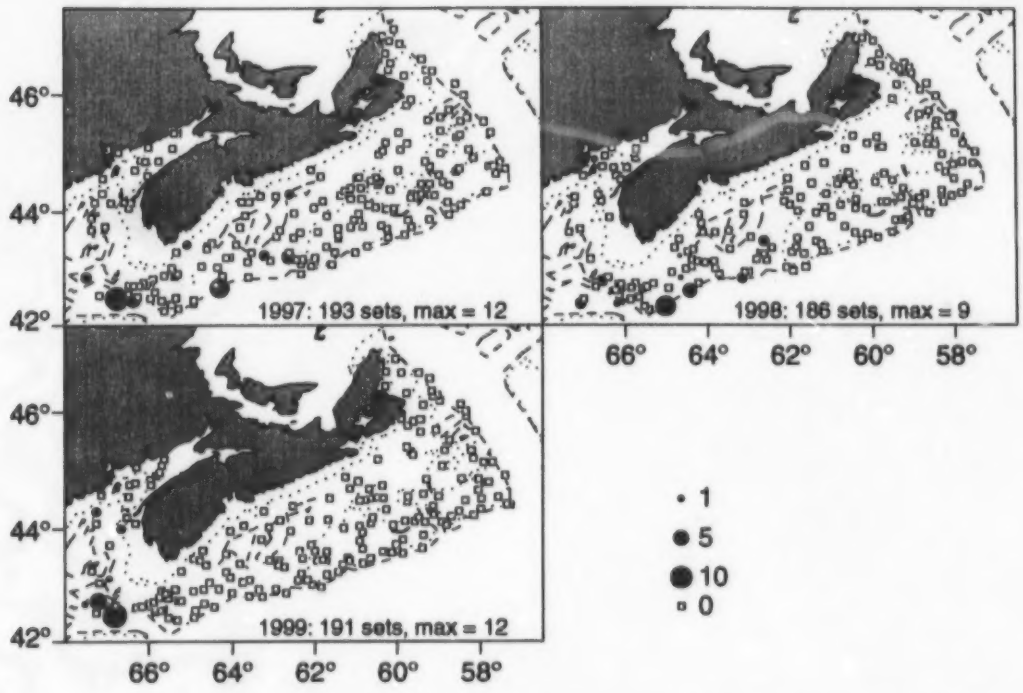

Fig. 95. 4VWX Cusk Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

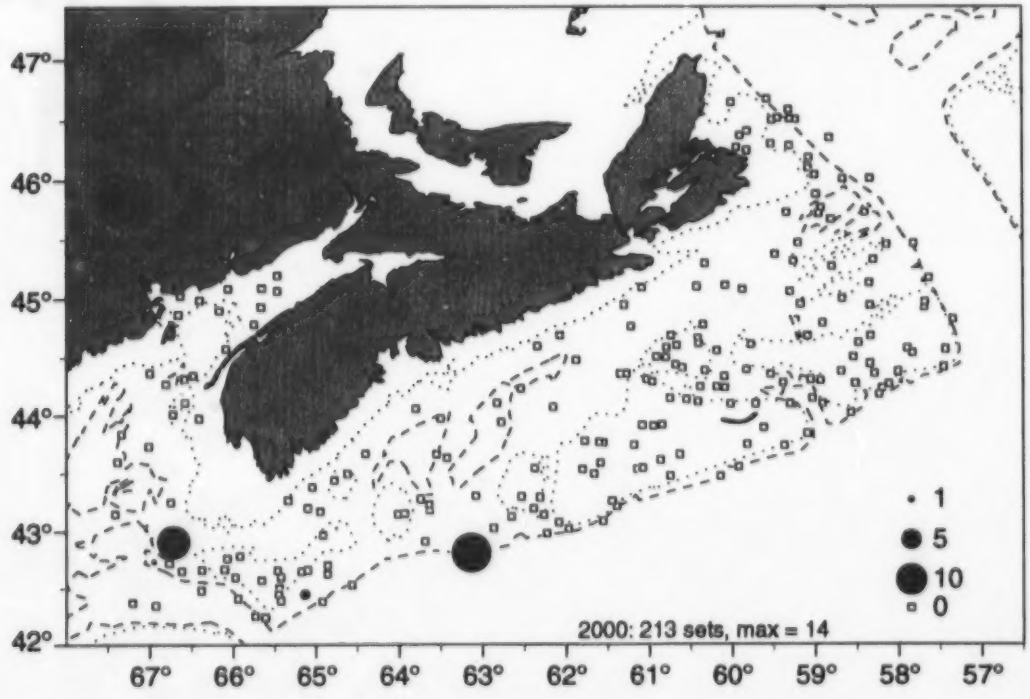

Fig. 96. 4VWX Cusk Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

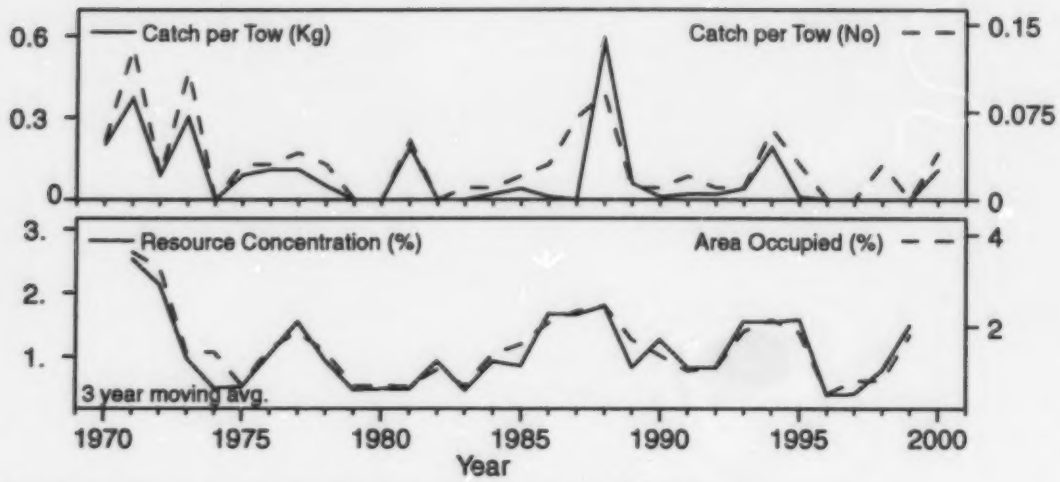

Fig. 97. 4VW Lumpfish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

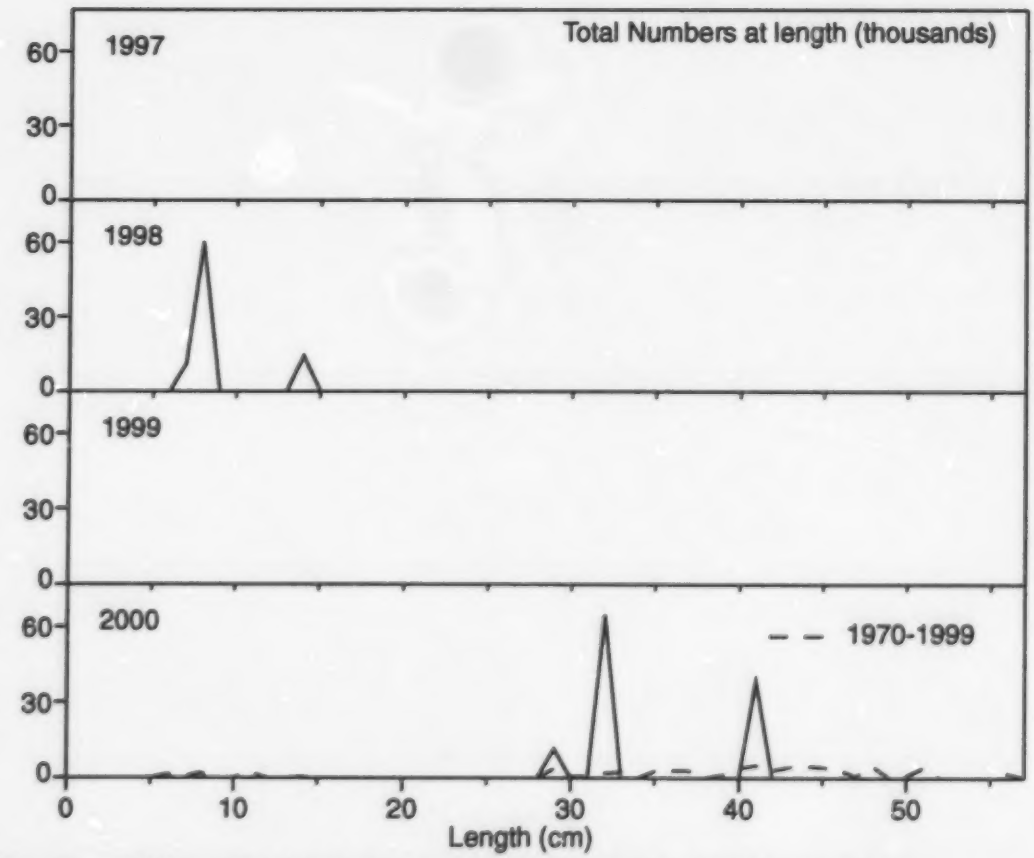

Fig. 98. 4VW Lumpfish length frequency distribution from the Summer surveys.

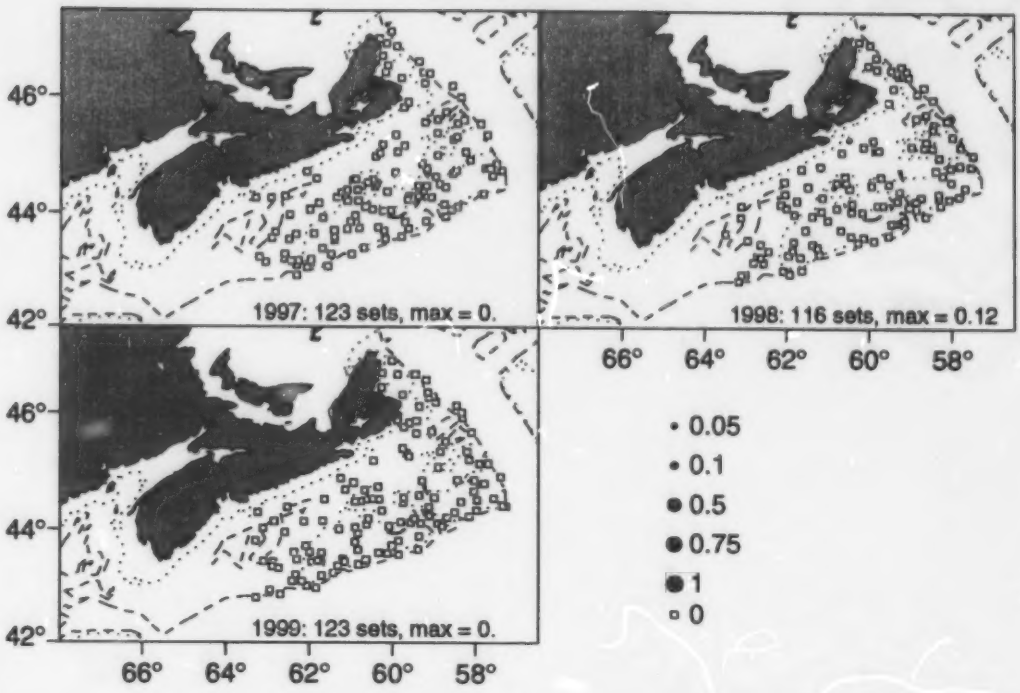

Fig. 99. 4VW Lumpfish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

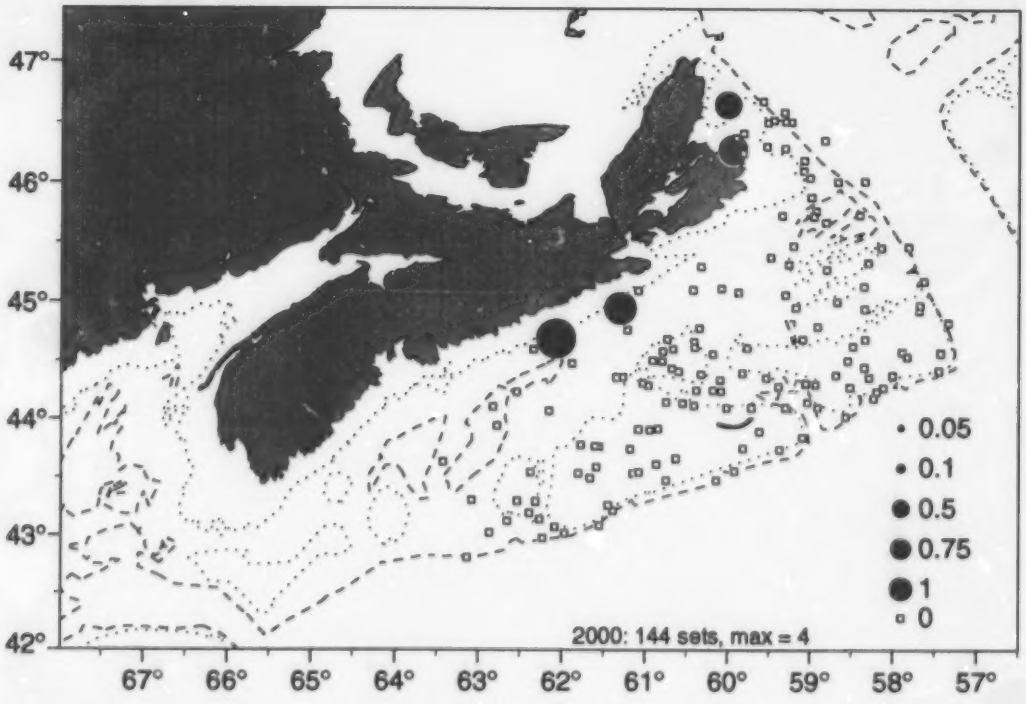

Fig. 100. 4VW Lumpfish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

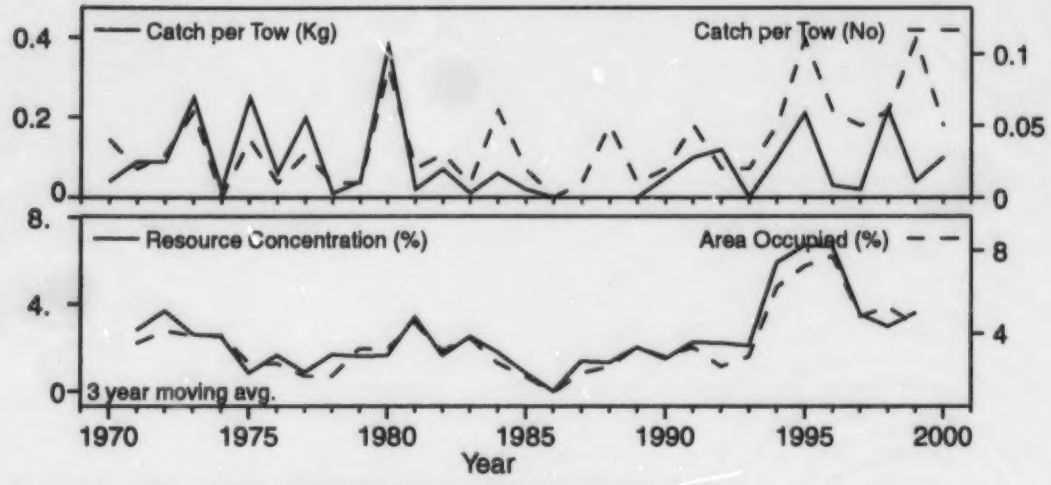

Fig. 101. 4X Lumpfish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

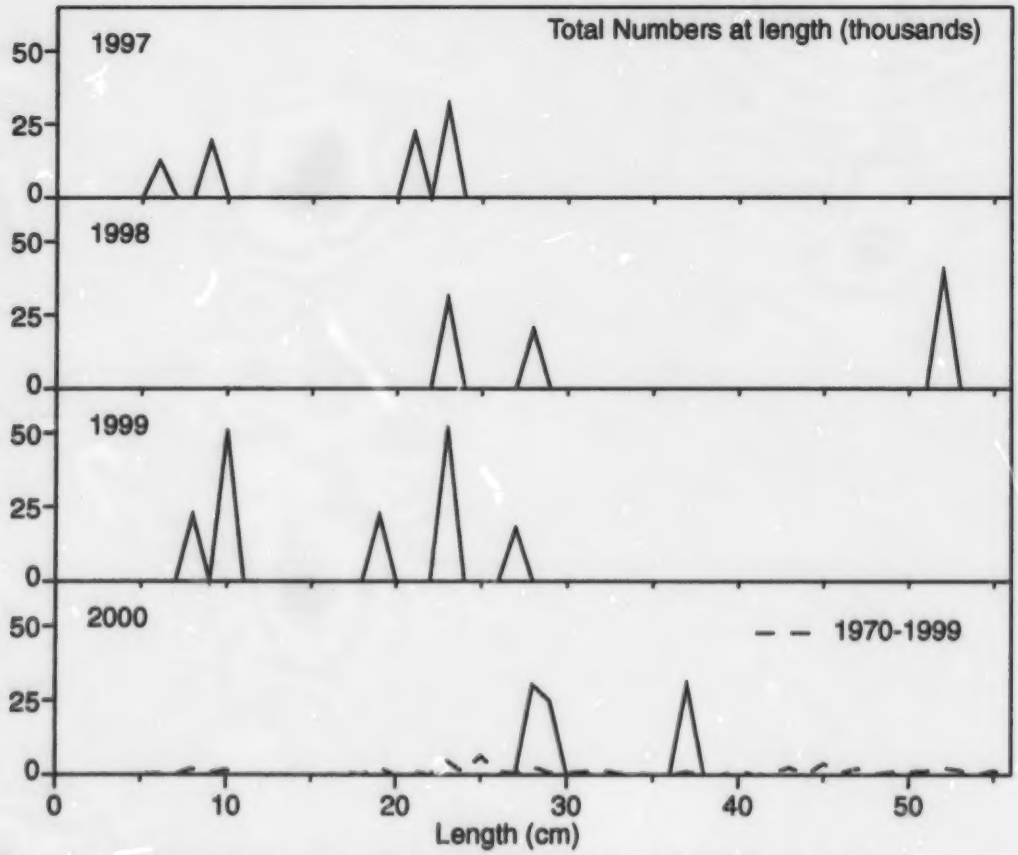

Fig. 102. 4X Lumpfish length frequency distribution from the Summer surveys.

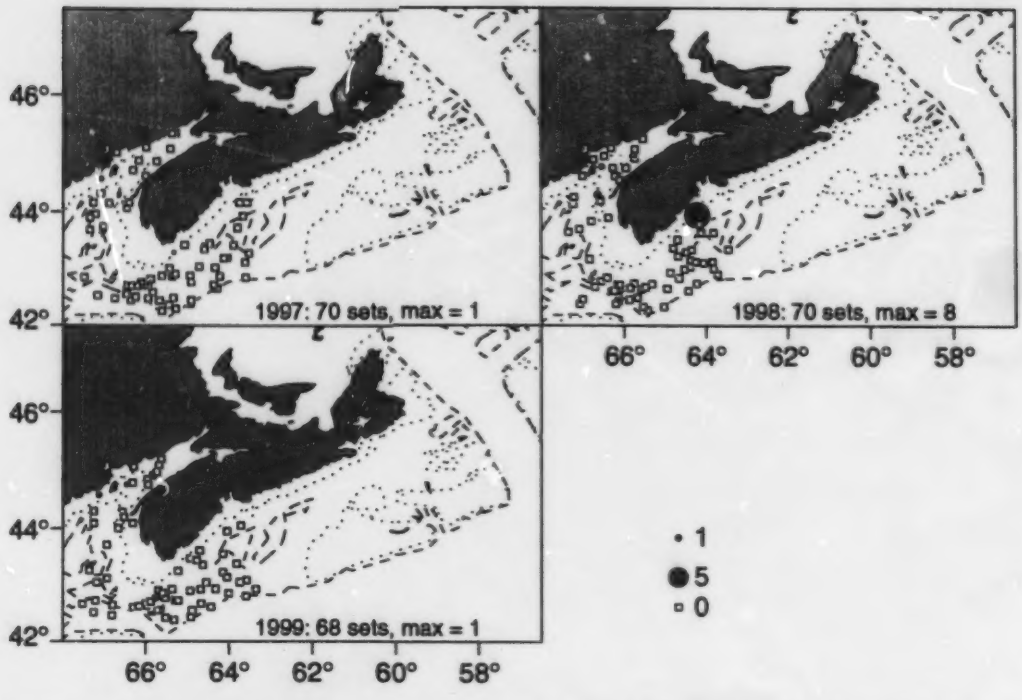

Fig. 103. 4X Lumpfish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

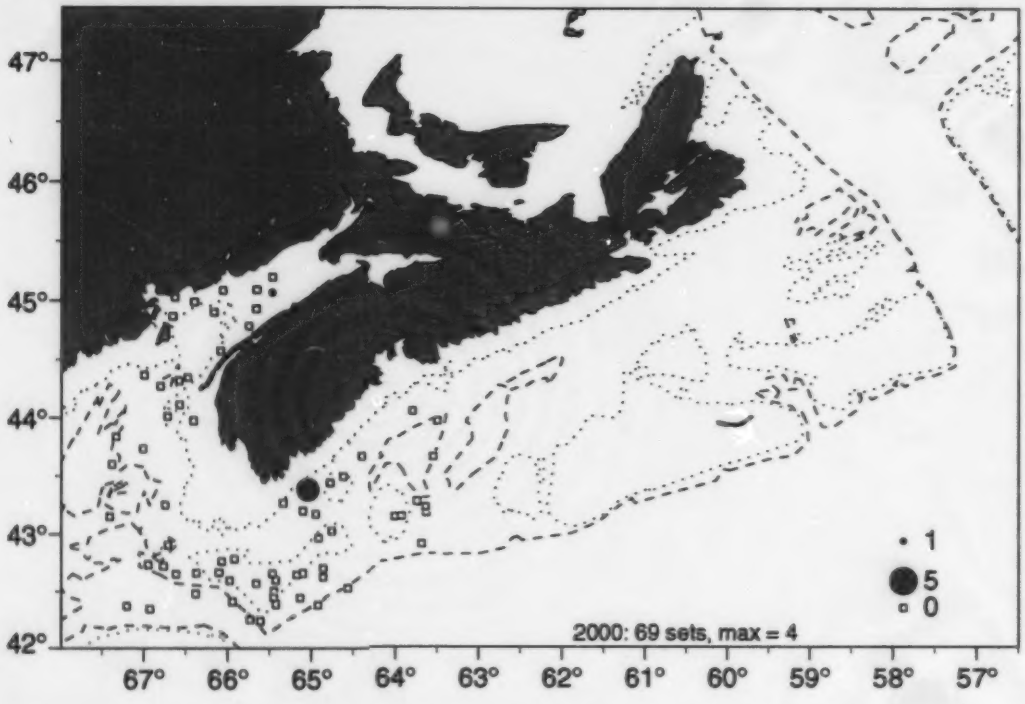

Fig. 104. 4X Lumpfish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

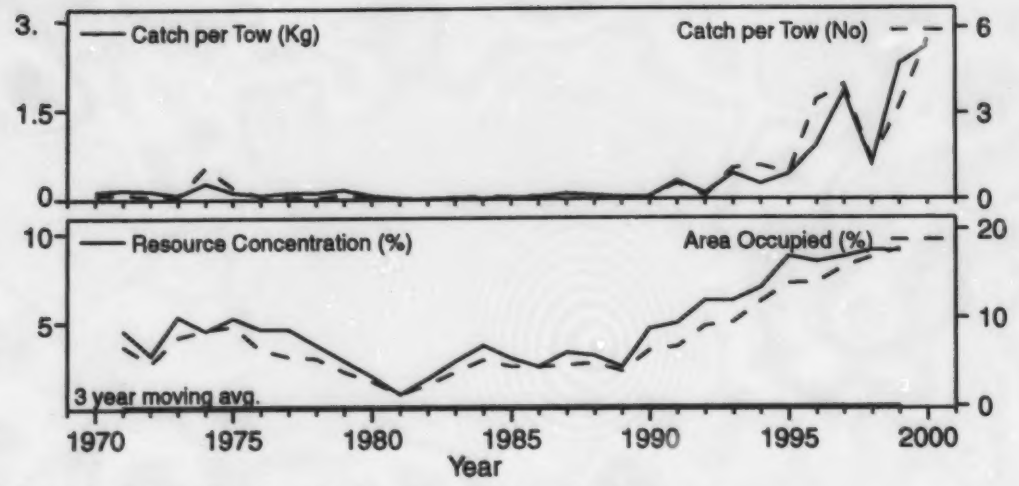

Fig. 105. 4VW Turbot stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

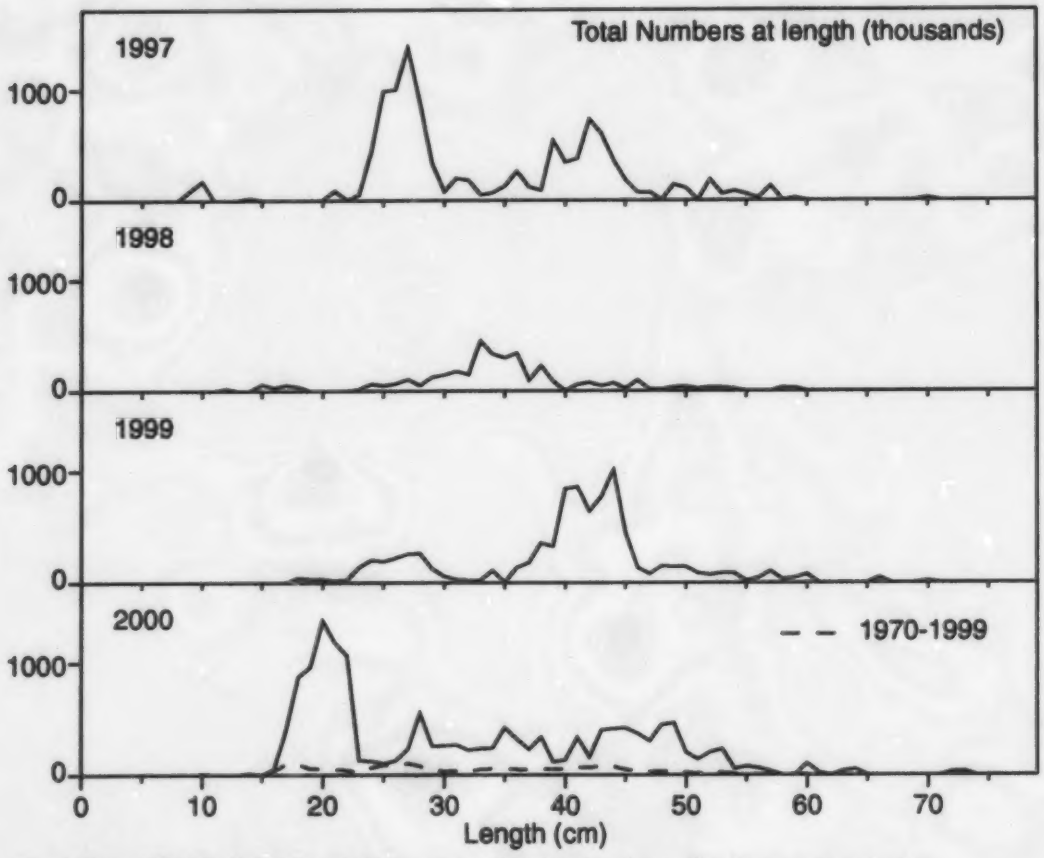

Fig. 106. 4VW Turbot length frequency distribution from the Summer surveys.

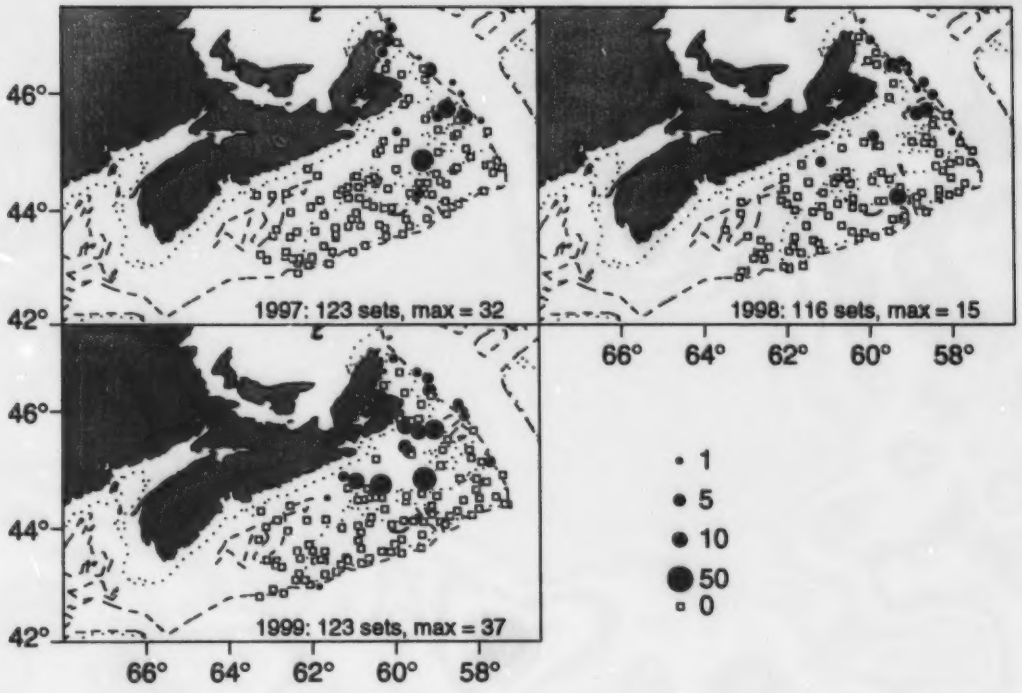

Fig. 107. 4VW Turbot Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

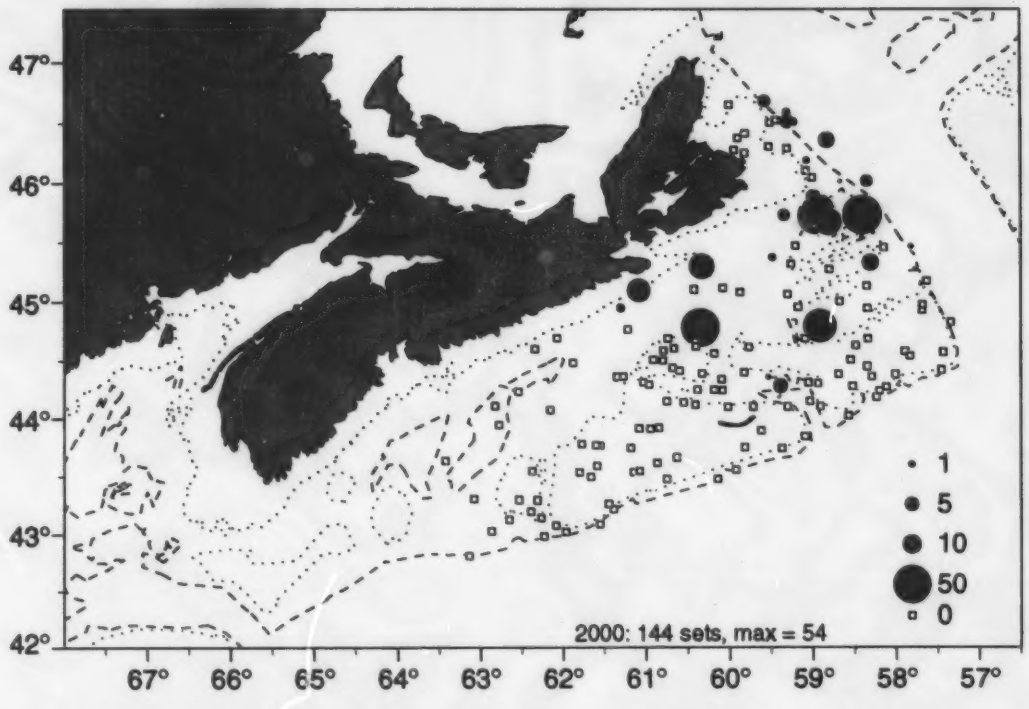

Fig. 108. 4VW Turbot Biomass (kg/tow) from the 2000 Summer Groundfish Survey.

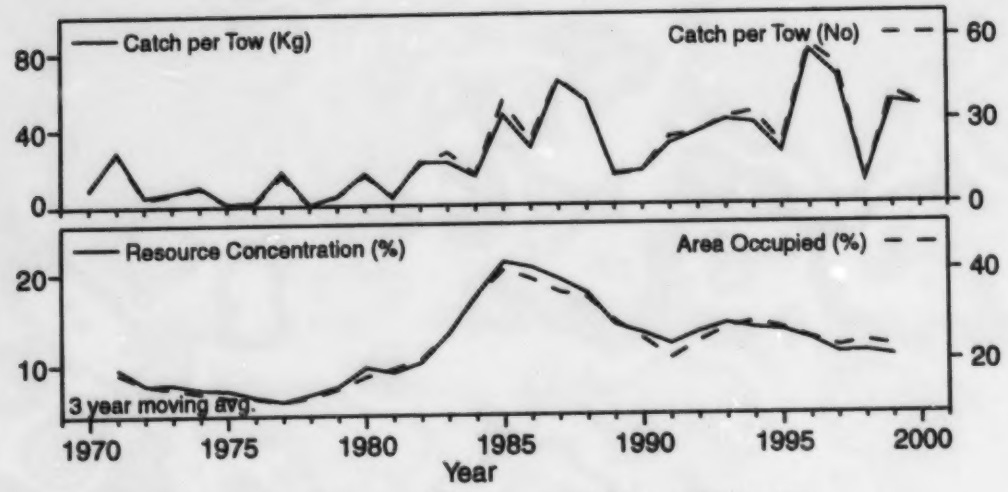

Fig. 109. 4VWX Spiny Dogfish stratified mean weight caught per tow, stratified mean number caught per tow, resource concentration and area occupied from the Summer surveys.

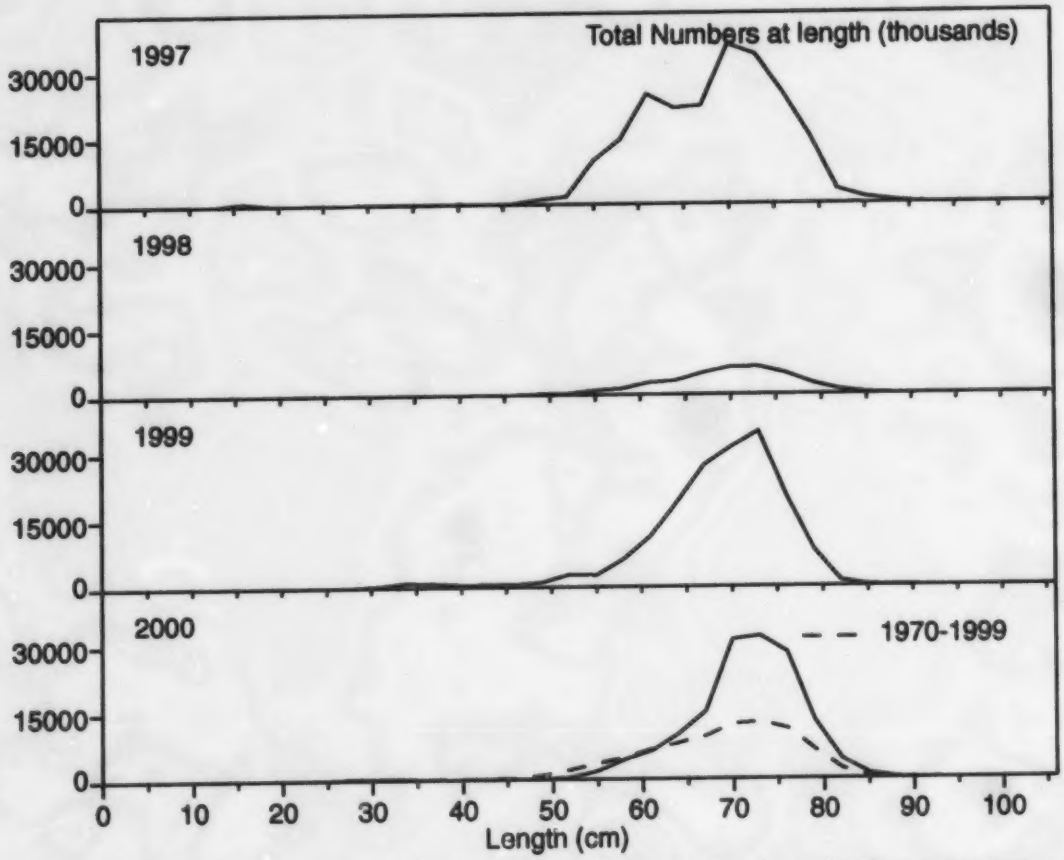

Fig. 110. 4VWX Spiny Dogfish length frequency distribution from the Summer surveys.

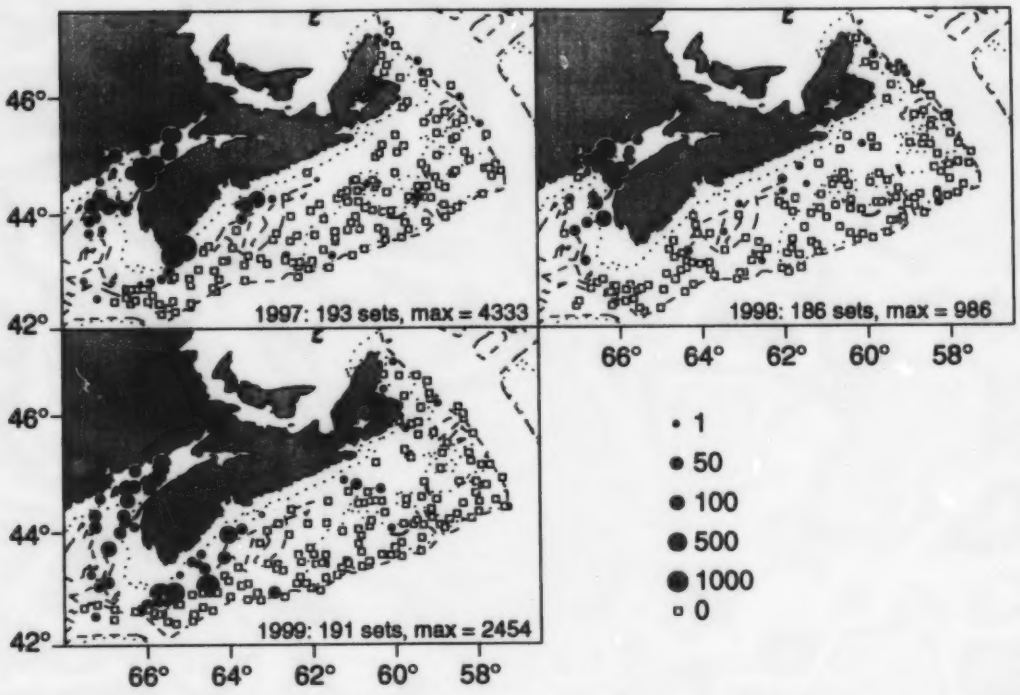

Fig. 111. 4VWX Spiny Dogfish Biomass (kg/tow) from the 1997-1999 Summer Groundfish Survey.

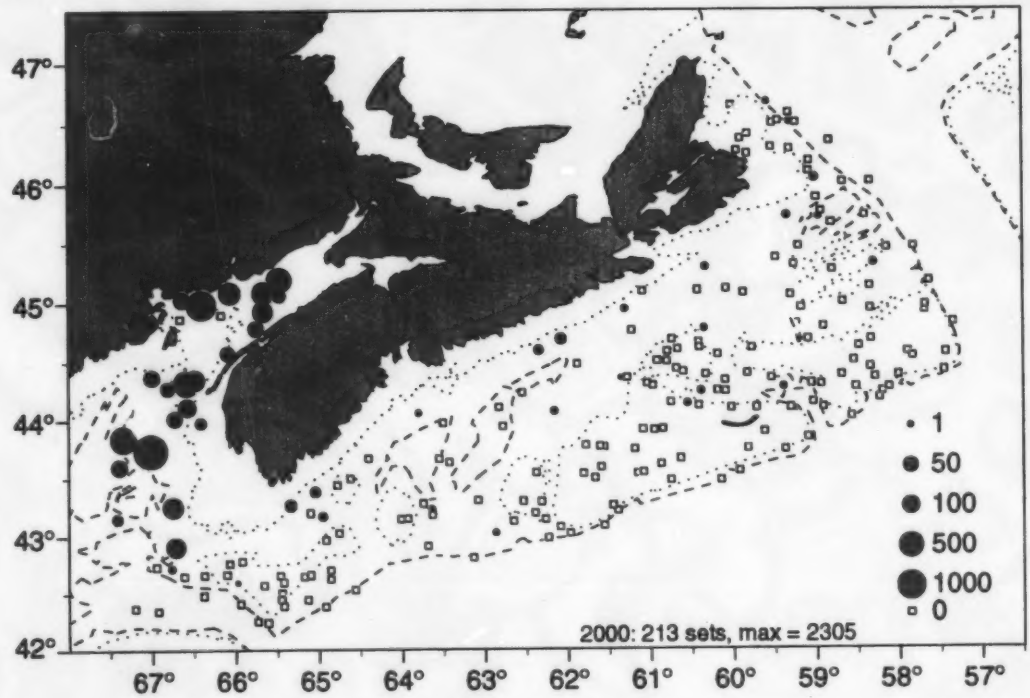

Fig. 112. 4VWX Spiny Dogfish Biomass (kg/tow) from the 2000 Summer Groundfish Survey.